RAILROAD GAZETTE

FRIDAY, JANUARY 5.

Train Accidents in November.

The following accidents appear in our record for the month of November:

REAR COLLISIONS.

On the afternoon of the 1st the engineer of a freight train on the Brunswick & Albany road left his train standing at Satilla, Ga., while he went ahead to a water tank. In some way the train started and ran back down grade and into the head of a following passenger train, which it met on a trestle. Several lumber cars were thrown over the trestle and wrecked.

On the evening of the 1st a passenger train on the New London Northern road ran into the rear of a freight train at Palmer, Mass., wrecking several cars.

On the evening of the 1st a freight train on the Indianapolis & St. Louis road ran into a preceding freight near Paris, Ill., wrecking the engine and several cars and killing a brakeman.

On the evening of the 2d a passenger train on the East Tennessee, Virginia & Georgia road ran into the rear of a freight near Midway, Tenn. The engine and several cars were wrecked and the engineer badly hurt.

On the night of the 5th a freight train on the Wabash, St. Louis & Pacific road ran over a misplaced switch and into another freight on a siding in Springfield, Ill., doing some damage.

On the morning of the 7th a freight train on the Lehigh Valley road ran into the rear of another freight near Bowman Rail, Pa., wrecking an engine and several cars.

On the night of the 7th a freight train on the Boston & Albany road broke in two near Chester, Mass., and the rear section ran into the forward one, damaging 20 cars and injuring a brakeman.

On the morning of the 8th a special passenger train on the Maine Central road ran into the rear of a regular passenger train at Lincoln, Me., damaging a passenger car and injuring two persons. The special train had the President, Superintendent and several directors on board.

On the morning of the 8th a freight train on the Chesapeake, Ohio & Southwestern road ran into a preceding freight near Louisville, Ky., wrecking several cars and injuring two brakemen.

On the night of the 8th a freight train on the New York & New England road broke in two near Bolton Notch, Conn., and the rear section ran into the foward one, damaging three cars.

On the morning of the 10th a passenger train on the Louisville & Nashville road ran over a misplaced switch and into a freight engine standing on a siding in Newport, Ky. Both engines and two cars were damaged.

On the night of the 10th a passenger train on the Illinois Central road ran into a box car which had been blown out on the main track at Sulphur Springs, Ia. The car and the engine were damaged and the engineer hurt.

On the morning of the 13th a passenger train on the Connecticut River Road ran over a misplaced switch and into the rear of another passenger train at Chicopee Junction, Mass., doing a little damage.

About noon on the 13th an express passenger train on the New York Central & Hudson River road ran into a local train which was backing across the track in Poughkeepsie, N. Y., the proper signals not being displayed. The engine and two cars were damaged, and three passengers hurt.

On the evening of the 13th a freight train on the Wabash, St. Louis & Pacific road broke in two near Mexico, Mo., and the rear section ran into the forward one, damaging several cars.

On the night of the 13th a freight train on the Rochester & Pittsburgh road ran into the rear of a preceding freight at East Gainesville, N. Y., damaging the engine and several cars.

On the night of the 14th a passenger train on the Northern Pacific road ran into the rear of a work train standing at Muskoda, Minn., wrecking several cars.

Early on the morning of the 15th a freight train on the Chicago, St. Paul, Minneapolis & Omaha road ran into the rear of a stock train which had stopped at Roberts, Wis., for water, wrecking several cars. The wreck caught fire and 15 cars were burned up. The conductor was caught under the caboose and burned to death, a brakeman fatally hurt and another less severely injured.

On the night of the 15th an express freight on the New London Northern road ran into the rear of a local freight which had stopped at Monson, Mass., wrecking the engine and several cars. The local train ought to have waited for the express at a preceding station, but left a flagman, who was taken up by the express. The latter train, however, continued to run at a high speed.

On the morning of the 15th a freight train on the Canada Southern road ran into another freight standing at the head of the yard in St. Thomas, Ont., wrecking 12 cars and injuring two trainmen.

On the evening of the 16th a freight train on the Lake Shore & Michigan Southern road ran into a preceding freight near Stryker, O., wrecking several cars.

Very early on the morning of the 17th a freight train on the Troy & Boston road ran into the rear of another freight at Hoosick Junction, N. Y., damaging an engine and 14 cars and killing a brakeman. There was a dense fog at the time.

On the morning of the 17th, as a freight train on the Boston & Lowell road was making a flying switch at Billerica, Mass., the detached cars ran into some cars standing on a siding and several cars were damaged. The conductor was thrown between the cars and killed, and a brakeman was hurt.

On the night of the 18th a freight train on the Burlington, Cedar Rapids & Northern road ran into the rear of a preceding freight near Morse, Ia., wrecking several cars.

On the night of the 18th a passenger train on the Central Pacific road ran into the rear of a freight train near Davisville, Cal., damaging the engine and several cars and killing a brakeman. The wreck caught fire and several cars were destroyed.

On the morning of the 19th a passenger train on the Burlington, Cedar Rapids & Northern road ran into some freight cars which had been left on a siding at Albert Lea, Minn., so that some of them projected over on the main track. The engine and several cars were wrecked, the engineer and fireman hurt.

On the night of the 19th a freight train on the Cincinnati, Hamilton & Dayton road ran into another freight which was going into a siding at Camden, O. Several cars were wrecked.

On the morning of the 20th a freight train on the New York, Pennsylvania & Ohio road ran into the rear of a preceding freight near West Windsor, O., wrecking two cars and killing a brakeman.

On the evening of the 20th a Galveston, Houston & Henderson freight train ran into the rear of a Galveston, Harrisburg & San Antonio freight in Harrisburg, Tex. A man standing on the platform of the caboose was killed.

On the night of the 20th a passenger train on the Chicago & Northwestern road ran into the rear of a freight near Barnboo, Wis., wrecking several cars and killing three tramps who were stealing a ride.

On the morning of the 21st a freight train on the St. Louis, Iron Mountain & Southern road ran into a preceding freight near Carondelet, Mo., doing a little damage.

On the morning of the 23d a wild engine on the Troy & Boston road ran into the rear of a freight train near Melrose, Mass., wrecking several cars.

On the morning of the 23d a passenger train on the Chicago, St. Paul, Minneapolis & Omaha road ran over a misplaced switch and into an engine standing on a siding at Crystal Lake, Minn. The engine and two cars were damaged, a passenger thrown through a window and hurt.

On the evening of the 23d a passenger train on the New York & New England road ran into the rear of a freight train at Brewsters, N. Y., doing a little damage.

On the night of the 23d an Indianapolis & St. Louis yard engine ran into the rear of a Cincinnati, Indianapolis, St. Louis & Chicago freight train in Indianapolis, Ind., doing some damage.

On the morning of the 24th a coal train on the Lehigh Valley road ran into a preceding coal train near Parryville, Pa., wrecking a number of cars.

On the 24th a coal train on the Albany & Susquehanna road ran into a preceding coal train near Unadilla, N. Y., wrecking 20 cars.

On the evening of the 25th a work train on the Intercolonial road ran into the rear of a passenger train which had been delayed by snow near Bartibogue, N. B. The engine and one car were completely wrecked, the engineer, fireman and brakeman fatally scalded and two laborers slightly hurt.

On the morning of the 26th a freight train on the Baltimore & Ohio road ran into a preceding freight in Zanesville, O., wrecking several cars and throwing a car against a building, tearing it down.

On the night of the 27th a wild engine on the Kentucky Central road ran into the rear of a freight train near Boyd, Ky., wrecking several cars. The wreck caught fire and was destroyed.

On the evening of the 28th a passenger train on the Chicago, Milwaukee & St. Paul road ran into the rear of a freight near Sabula, Ia., wrecking two cars.

Very early on the morning of the 29th a passenger train on the Georgia Railroad ran into some cars which had broken loose from a preceding freight car near Union Point, Ga., wrecking several cars.

A few minutes afterward a following freight came up and ran into the rear of the passenger train, wrecking a car. Three trainmen were hurt.

On the morning of the 29th a passenger train on the New York, Lake Erie & Western road ran into the rear of a freight train near Greenwood, N. Y., wrecking several cars, killing a trainman and injuring two others.

On the afternoon of the 29th a local passenger train on the Central Vermont road ran into an express train at Montpelier Junction, Vt., damaging two cars and injuring a trainman and two passengers.

BUTTING COLLISIONS.

On the morning of the first there was a butting collision between a Western & Atlantic passenger train and an East Tennessee freight in the yard in Chattanooga, Tenn. Both engines were damaged and three trainmen hurt.

On the morning of the 4th there was a butting collision between a passenger and a freight train on the New York & New England road near Pomfret, Conn., caused by the freight train running past the meeting point. Both engines and several cars were damaged and five trainmen hurt.

On the evening of the 7th there was a butting collision between a freight and a repair train on the Richmond & Danville road near Sweet Hall, Va. The freight engine was badly broken. The engineer of the repair train reversed and jumped, and the train started off backwards with no one on board. The brakes were on and it ran slowly, and after going some four miles a switchman jumped on and stopped it.

On the morning of the 8th there was a butting collision between a freight and a repair train on the Wabash, St. Louis & Pacific road near Havana, Ill. Both engines were wrecked and one man hurt.

Near midnight on the 8th there was a butting collision between a passenger and a freight train on the St. Louis, Keokuk & Northwestern road near Hannibal, Mo. Both engines and six cars were piled up in a bad wreck.

On the evening of the 9th two yard engines on the Lake Shore & Michigan Southern road came together in Chicago, Ill. Both engines were damaged and five men hurt.

On the afternoon of the 10th there was a butting collision between two freight trains on the New York & New England road near East Douglas, Mass., by which both engines and several cars were wrecked and a fireman hurt. The accident is said to have been caused by disobedience of orders.

On the morning of the 11th there was a butting collision between a freight train and a wild engine on the Pittsburgh & Lake Erie road near Kassola, Pa., by which both engines were badly damaged, a fireman killed and a brakeman hurt. The engineer of the wild engine is charged with starting from Kassola without orders.

On the morning of the 15th a freight train on the Missouri, Kansas & Texas road broke in two near Bell, Tex., and the detached section ran back down grade and into the head of a following passenger train. The engine and several cars were wrecked and the engineer badly hurt.

On the night of the 15th some cars of a freight train on the St. Louis, Iron Mountain & Southern road broke loose from the train at Hogan Mountain, Mo., and ran back down the grade at high speed and into a helping engine which was following. The engine and several cars were wrecked, the engineer, fireman and a brakeman badly hurt.

On the night of the 18th there was a butting collision between a passenger and a freight train on the Wabash, St. Louis & Pacific road, near Kansas City, Mo. Both engines were damaged.

On the morning of the 27th there was a butting collision between two freight trains on the Northern Central road near Shamokin, Pa. Both engines and several cars were wrecked and a fireman hurt.

About noon on the 28th there was a butting collision between two passenger trains on the Pittsburgh Southern road near Upperman, Pa., by which both engines and the baggage cars were badly broken, the conductor and three passengers slightly hurt.

On the morning of the 29th there was a butting collision between a passenger train and a wild engine on the Shenandoah Valley road near Sharpsburg, Md. Both engines were wrecked, the engineer and fireman hurt.

On the 29th there was a butting collision between a passenger and a freight train on the Wabash, St. Louis & Pacific road near Sturgeon, Mo., by which both engines several cars were wrecked.

On the morning of the 30th there was a butting collision between a passenger train and a coal train on the Bell's Gap road near Bell's Mills, Pa., wrecking the engine and several cars. The coal train was running down grade without an engine, and the breaking of a brake-chain made it impossible to stop.

On the afternoon of the 30th there was a butting collision between a freight and a local passenger train on the Pittsburgh, Ft. Wayne & Chicago road near New Waterford, O. Both engines were wrecked, a fireman killed and both engineers hurt.

CROSSING COLLISIONS.

On the morning of the 1st a New Jersey Central coal train ran into a Delaware, Lackawana & Western coal train at Diamond Crossing, near Scranton, Pa., wrecking several cars and an engine. It is said that the watchman neglected to display the signal.

On the 4th a Chicago, Milwaukee & St. Paul freight train ran into a Wisconsin Central freight in Portage, Wis., damaging several cars.

On the morning of the 16th a Toledo, Cincinnati & St. Louis freight ran into a Pittsburgh, Cincinnati & St. Louis freight at the crossing in Dayton, O., damaging several cars.

On the morning of the 23d a Boston, Hoosac Tunnel & Western passenger train ran into a Troy & Boston passenger engine which was crossing the track at Petersburg Junction, N. Y., wrecking the tender.

DERAILMENT, BROKEN RAIL.

On the night of the 19th a passenger train on the Houston & Texas Central road was thrown from the track near Bryan, Tex., by a broken rail and five cars went down a bank injuring 15 passengers.

DERAILMENT, BROKEN FROG.

On the morning of the 4th several cars of a freight train on the Cincinnati, Hamilton & Dayton road were thrown from the track at Cidersville, O., by a broken frog.

DERAILMENT, BROKEN BRIDGE.

On the morning of the 25th a freight train on the Texas & Pacific road went through a bridge near Clarksville, Tex., and the engine and several cars went down into the creek, killing the fireman and injuring the engineer.

DERAILMENTS, SPREADING OF RAILS.

On the morning of the 3d a St. Louis & San Francisco freight train was thrown from the track in the tunnel at Kirkwood, Mo., on the Missouri Pacific road, by the spreading of the rails. The engine and 17 cars were piled up in the tunnel in a bad wreck, blocking the road all day.

On the morning of the 10th a passenger train on the Wabash, St. Louis & Pacific road was thrown from the track near Stanberry, Mo., by the spreading of the rails. The engine and several cars were wrecked, a trainman killed, and three others hurt.

On the morning of the 17th, the engine and one car of a passenger train on the Milwaukee, Lake Shore & Western road were thrown from the track near Monico, Wis., by the spreading of the rails.

On the morning of the 17th, a dead engine, which was being hauled behind a freight train on the Texas & Pacific road, was thrown from the track near Baird, Tex., by the spreading of the rails.

On the morning of the 17th, the engine and 14 cars of a freight train on the Houston & Texas Central road were thrown from the track near Bremond, Tex., by the spreading of the rails. The engine was wrecked, and a car of cotton burned.

On the morning of the 20th, a passenger train on the Cincinnati, Georgetown & Portsmouth road was thrown from the track near California, O., by the spreading of the rails. The engine upset down a bank, injuring the engineer.

On the afternoon of the 28th, a freight train on the Chicago, Milwaukee & St. Paul road was thrown from the track near Coon Rapids, Ia., by the spreading of the rails.

Early on the morning of the 28th a passenger train on the Hannibal & St. Joseph road was thrown from the track in West Quincy, Mo., by the spreading of the rails. Two baggage cars were wrecked.

On the night of the 29th a car of a passenger train on the Mississippi & Tennessee road was thrown from the track near Hernando, Miss., by the spreading of the rails. The car rolled down a high bank, injuring the conductor and four passengers.

DERAILMENT, BROKEN WHEEL.

On the morning of the 4th several cars of a freight train on the East Tennessee, Virginia & Georgia road were thrown from the track near Chattanooga, Tenn., by a broken wheel. The conductor was thrown under a car and killed.

On the night of the 11th a passenger train on the Bradford, Eldred & Cuba road was thrown from the track by a broken wheel on a trestle near Clarksville, N. Y., and the engine and three cars fell 30 ft. into a ravine and were completely wrecked, killing three trainmen and two passengers, and injuring nine passengers.

On the morning of the 14th several cars of a freight train on the Cincinnati, New Orleans & Texas Pacific road were thrown from the track in the tunnel at King's Mountain, Tenn., by a broken wheel. The wreck was piled up in the tunnel, making a bad job for the wreck-train.

DERAILMENT, BROKEN TIRE.

On the morning of the 26th a passenger train on the New York, Lake Erie and Western road, drawn by two engines, was thrown from the track near Hornellsville, N. Y., by the breaking of the tire of a driving wheel on the second engine. Both engines and five cars were wrecked and a fireman killed.

DERAILMENTS, BROKEN AXLE.

On the morning of the 6th two cars of a passenger train on the Chicago, Burlington & Quincy road were thrown from the track near Alexandria, Neb., by a broken axle. A brakeman was thrown between the cars and killed.

On the afternoon of the 24th eight cars of a freight train on the Louisville & Nashville road were thrown from the track near Mobile, Ala., by a broken axle.

DERAILMENT, BROKEN TRUCK.

On the afternoon of the 19th a car of a freight train on the New York Central & Hudson River road was thrown from the track at Fisher, N. Y., by a broken truck.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the morning of the 5th a passenger train on the Central Pacific road, drawn by two engines, ran into a rock which had fallen on the track near Crystal Lake, Cal. Both engines were thrown from the track and badly wrecked, 70 ft. of snow-shed torn down, the engineer and fireman hurt, and a tramp killed.

On the evening of the 14th a repair train on the Chicago & Alton road, running backwards near Oak Grove, Mo., struck a hand-car and six cars were thrown from the track and wrecked, killing five laborers and injuring 11 others.

DERAILMENTS, CATTLE.

On the afternoon of the 15th a freight train on the Gal-

veston, Harrisburg & San Antonio road ran over a cow near Waelder, Tex., and the engine and several cars were thrown from the track.

On the afternoon of the 28th a coal train on the Union Pacific road ran over a bull near Peterson, Utah, and the engine and 14 cars were thrown from the track.

DERAILMENTS, MISPLACED SWITCH.

On the night of the 3d a Fitchburg freight train backing into the yard at North Adams, Mass., was thrown from the track by a misplaced switch.

On the night of the 8th a freight train on the New York Central & Hudson River road was thrown from the track at Schodack, N. Y., by a misplaced switch, and the engine and 18 cars were piled up in a bad wreck.

On the morning of the 14th a freight train on the Troy & Greenfield road was thrown from the track at Deerfield, Mass., by a misplaced switch. The engine and 12 cars ran down a bank and four cars were badly broken. Two trainmen were hurt.

On the afternoon of the 15th a coal train on the Delaware, Lackawanna & Western road was thrown from the track at Poolville, N. Y., by a misplaced switch, and the engine and three cars upset.

On the night of the 15th the engine and four cars of a passenger train on the Chicago & Northwestern road were thrown from the track at Cary, Ill., by a misplaced switch. The engineer was hurt.

On the night of the 26th the engine and several cars of a freight train on the Detroit, Grand Haven & Milwaukee road were thrown from the track at Davisburg, Mich., by a misplaced switch.

MISCELLANEOUS DERAILMENTS.

On the evening of the 2d a coal train on the inclined plane road at McIntyre Mine, Pa., broke loose and ran down at great speed, jumping the track at the foot of the plane. The train was wrecked, three miners, who were returning home, killed and two hurt.

On the afternoon of the 21st a freight train on the Richmond, Fredericksburg & Potomac road was thrown from the track at Hamilton's Crossing, Va., where some sectionmen had taken out two rails for repairs and had neglected to put out a signal. The engine and five cars went down a bank and were wrecked, killing the engineer.

On the morning of the 28th a freight train on the New York Central & Hudson River Road ran through an open draw at Cayuga, N. Y., the engine landing on the deck of a canal boat.

MALICIOUS DERAILMENTS.

On the night of the 10th the coal train on the Philadelphia & Reading road struck some heavy timbers which had been put across the track on a high embankment near Limerick, Pa. The engine and some 20 cars were thrown from the track and down the bank, and piled up in a bad wreck. The trainmen jumped and escaped. It is believed that the intention was to wreck the night express. An attempt to wreck that train had been made a few days before near the same place.

Very early on the morning of the 22d an express train on the Pittsburgh, Cincinnati & St. Louis road was wrecked near Union Station, O., by a rail which had been placed across the track. The engine pitched down an enbankment over 30 ft., turning twice over and landing in a field. The engineer and fireman escaped with slight bruises. Two postal cars and a baggage and passenger car went down the bank and were wrecked. Five trainmen and seven passengers were hurt, most of them slightly.

On the evening of the 28th a passenger train on the Richmond & Danville road was thrown from the track near Easley, S. C., by obstructions placed on the track.

On the night of the 29th the engine of a passenger train on the Old Colony road was thrown from the track by a large stone which had been placed on the track near West Quincy, Mass., by some person unknown.

UNEXPLAINED DERAILMENTS.

On the morning of the 3d the engine of a passenger train on the Pittsburgh, Titusville & Buffalo road ran off the track near Shippenville, Pa., and a trainman was hurt.

On the morning of the 6th a repair train on the New Brunswick road ran off the track near Edmundston, N. B., and five laborers were hurt.

On the morning of the 8th several cars of a freight train on the Wilmington & Northern road ran off the track at Centre, Del., and one car upset down a bank.

About noon on the 13th several cars of a freight train on the Utica, Clinton & Binghamton road ran off the track in Utica, N. Y., blocking the road a short time.

On the morning of the 16th six cars of a coal train on the New York Central & Hudson River road ran off the track at Charlotte, N. Y., doing a little damage.

On the morning of the 16th several cars of a freight train on the Missouri Pacific road ran off the track at Petersburg, Mo., injuring a brakeman.

On the afternoon of the 16th three cars of a freight train on the New York, New Haven & Hartford road ran off the track at Windsor Locks, Conn., and went down a bank.

On the afternoon of the 22d the engine of a freight train on the Pittsburgh & Western road ran off the track in Allegheny, Pa., blocking the road an hour.

On the morning of the 22d a Boston, Hoosac Tunnel & Western freight train ran off the track in the yard at North Adams, Mass., damaging several cars.

On the night of the 22d five cars of a freight train on the New York, Ontario & Western road ran off the track near Rockdale, N. Y., and went down a bank.

On the afternoon of the 23d a passenger train on the Intercolonial road ran off the track near Mill Stream, N. B., damaging the engine.

On the morning of the 23d a passenger train on the Chicago, Milwaukee & St. Paul road ran off the track in East Hastings, Minn., and the engine and one car upset down a bank. The engineer was killed, the fireman and conductor hurt.

On the morning of the 24th seven cars of a freight train on the New York, Susquehanna & Western road ran off the track near Wantage Church, N. J., blocking the road several hours.

On the afternoon of the 26th a car of a freight train on the New York Central & Hudson River road ran off the track near Looneyville, N. Y., blocking one track two hours.

On the morning of the 27th a passenger train on the Delaware, Lackawanna & Western road ran off the track near Onativia, N. Y., doing some damage.

On the afternoon of the 27th the engine of a freight train on the Genesee Valley road ran off the track in Rochester, N. Y., blocking the road several hours.

On the afternoon of the 27th a mixed train on the Lehigh & Hudson River road ran off the track near Warwick, N. Y., and the engine upset into the ditch, six loaded ore cars being piled up on top of it. The engineer and fireman were caught under the wreck and scalded to death; a brakeman was badly hurt.

On the morning of the 28th the engine and several cars of a coal train on the Missouri Pacific road ran off the track in Rich Hill, Mo., and the engine upset.

On the night of the 28th, a passenger train on the Missouri, Kansas & Texas road ran off the track near McAllister, Ind. Ter., blocking the way eight hours.

On the morning of the 29th a coal train on the Delaware, Lackawanna & Western road ran off the track near Scranton, Pa., blocking the track for an hour.

BOILER EXPLOSION.

On the morning of the 3d the engine of a freight train on the New York Central & Hudson River road had the flue-sheet in the fire-box give way while standing at Brockport, N. Y. The fireman was slightly scalded before he could jump.

OTHER ACCIDENTS.

On the night of the 12th the engine of a freight train on the New York, Lake Erie & Western road blew out a cylinder head at Goshen, N. Y., and was disabled.

On the night of the 14th, the express car on a Grand Trunk passenger train caught fire when near Lancaster, Ont., and was destroyed.

SUMMARY.

This is a total of 125 accidents, in which 36 persons were killed and 129 injured; a daily average of 4 accidents, 1¼ killed and 4⅛ injured.

Twenty-six of the killed and 81 of the injured were railroad employés: 10 of the killed and 48 of the injured were passengers or others riding on the trains.

The whole number of casualties was 165, of which 107, or 64.8 per cent. were to employés, and 58, or 35.2 per cent. to passengers.

For the eleven months of 1882 there have been reported 1,216 accidents, in which 351 persons were killed and 1,379 injured; a monthly average of 111 accidents, 32 killed and 125 injured.

Contributions.

Errata—Speed of Trains.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice several misprints in my paper on the "Comparative Speeds of the Fastest Trains in Europe and America," which you were good enough to publish in your last issue. Most of them are obvious enough, but the following corrections are needed:

The speed of the fast train from New York to Albany is only 40.6 miles per hour, as it requires 3½ hours for the run of 142 miles. It should have been stated that the engines which run the fast New York trains on the Boston & Albany have 5 ft. 8¾ in. driving-wheels.

The time of the East Coast express, known as the "Flying Scotchman," from London to Edinburgh, is but nine hours, including stoppages, which brings its average speed up to about 44 miles per hour. It is thus the fastest long-distance train in the world.

A. L. R.

BOSTON, Dec. 27, 1882.

"Railroad Economics" as a Pseudo Science.

[This paper was originally intended by the author as a contribution to the Railroad Gazette, but was afterward contributed as a paper and read January 3, 1883, before the American Society of Civil Engineers.]

Van Nostrand's Science Series, No. 59, is entitled "Railroad Economics," or "Notes with Comments from a Tour over Ohio Railways," * * * * by S. W. Robinson, C. E., Professor of Mechanical Engineering, Ohio State University, Columbus.

My attention was called to this volume by a gentleman engaged in a business that made it very desirable for him to know whether Professor Robinson's conclusion was true, that the average cost of a stop at a grade crossing (what is sometimes called the "know-nothing" stop) in the state of Ohio in 1881 was $1.28, this being the result of one of his calculations.

A brief examination of Professor Robinson's statement in the matter, which is the last subject treated in the volume referred to, filled me with amazement, and I have thought it desirable to point out the fallacy of his reasoning, and the general looseness in his statements for the following reasons, viz.:

1. Because Professor Robinson, as an instructor of youth, should be held to account for his looseness of expression, confusion of technical terms and the absurdity of his conclusions, as no mere practitioner of the science of engineering should be.

2. Because the position held by Professor Robinson, coupled with the *quasi* endorsement given to his statements by their publication in the report of the Commissioner of Railroads and Telegraphs of the state of Ohio, will give them greater weight than their merits warrant with the non-professional railroad officer or shareholder.

3. Because, as in the case of the gentleman who called my attention to them, they may be made the basis of business transactions, involving large interests.

I shall not attempt, in this paper, to show what is the average cost of making a stop at a grade-crossing in the state of Ohio, for the reason that I have not the data at my command, nor the time nor facilities for getting them; but I propose to show that Professor Robinson's statement of the alleged cost is a paralogism of the crudest kind.

Professor Robinson, whom I shall hereafter designate as "The author," makes a number of statements, and arrives at a variety of conclusions upon the subject, which I will summarize, to enable my readers to understand what it is I am criticising. I quote from his statements as follows, viz.:

1.*

"Some roads will place their estimates of expenses for all their stoppages at a single crossing point at from $100 to $500 per day (*a*). *We will probably be entirely safe in basing figures on the lesser amount* as true for a great number of railroads. For 300 days to the year the $100 per day will pay interest at 6 per cent. on an expenditure of half a million of dollars (*b*). Hence, at such a point as the one now considered, it would be economy to make an expenditure of anything less than $500,000 (*c*) to carry one line over the other.

"*This money would cut about a mile of tunnel.*

2.*

"But more definite figures on this point may be found of interest.

"The forthcoming report of the Commissioner of Railroads of Ohio contains the following figures, viz:

Total number of grade crossings reported, etc. 252 (*d*)
Total miles of railroad 5,835⅛ (*e*)
Average number of trains that passed over each mile of railway during the year 5,680 (*f*)
Gross earnings of all railroads in the state for the year 1881 $33,116 271 (*g*)

$\frac{5835\frac{1}{8}}{252}$ = 23.1 m. (*h*) Average distance between crossings

$\frac{5680}{330}$ = 17.03 (*j*) Average number trains per day, counting 330 days to the year (Sunday one-third day)

$\frac{33,116,271}{330}$ = $100,352 (*k*) Gross earnings per day

Assuming the average distance run each day by one train at 14.3 (*l*) miles per hour, the average time between crossings $\frac{23.1}{14.3}$ = 1.61 hours, or 96.6 minutes (*m*).

Now allowing five minutes as a fair average for the time lost by a train in making the crossing stop, we find that $\frac{5}{96.6}$ = 5.176 per cent. (*n*) of the running time is consumed in stopping at grade crossings. By avoiding this stop, *it appears Ohio roads could increase* their daily earnings by over 5 per cent. of the actual earnings, or exactly to the amount $\frac{\$100,352}{1-.05176}$ = $105,830 (*o*) which shows *a gain* $105,830 − 100,352 = $5,478 per day (*p*).

"*To find the cost of a single stop*, we have, by multiplying the average number of trains per day by the number of crossings reported 17.03 × 252 = 4,292 (*q*), the number of daily crossing stops. As these cost $5,478 it appears that *a single stop cost as an average* $1.28 (*r*).

"The total cost of stops for the year 1881 appears from the above figures to be 330 × 5,478 = $1,807,740. (*s*) This capitalized at 6 per cent. amounts to the enormous and seemingly incredible sum of over (*t*) $30,000,000. The actual number of crossings is only 126, as each crossing is reported twice. It appears, therefore, that there might be invested on 6 per cent. borrowed capital at each crossing point the sum of $\frac{\$30,124,000}{126}$ = $239,120 (*u*), or nearly a quarter of million dollars that might be expended at each crossing point for appliances which would enable trains to pass the crossings at full speed."

3.†

In the Report of the Commissioner of Railroads of the state of Ohio for 1881 there appears a statement from Professor Robinson which gives several other computations of the "cost of the know-nothing stop."

The first of these is made upon the same theory as that stated above (2), the data being the same, excepting the item designated as (*g*), which is stated in this version:

Gross earnings of all the railroads in the state for the year 1881, $45,822,984 (*v*).

This modifies his calculations thus (the reference letter preceding each item refers to corresponding item in the preceding computation):

(*k*). Gross earnings per day $\frac{\$45,822,984}{330}$ = $138,857 (*w*)

(*o*). Amount to which Ohio roads could increase their daily earnings by avoiding the stop $\frac{\$138,857}{1-.05176}$ = $146,426 (*x*).

(*p*). Which shows a gain of $146,426 − $138,857 = $7,569 (*y*) per day.

(*r*). Cost of single stop $\frac{\$7,569}{4,292\ (q)}$ = $1.77 (*z*).

(*s*) "The total cost of stops for the year 1881 appears from the above figures to be 330 × $7,569 = $2,497,770 (*aa*), or nearly two and a half millions of dollars.

(*t*) "This capitalized at 6 per cent. amounts to the enormous and seemingly incredible sum of over $40,000,000 (*bb*).

(*u*) "It appears, therefore, that there might be invested on 6 per cent. borrowed capital, at each crossing point, the sum of $41,629,500 ÷ 126 = $330,393 (*cc*), or nearly a third of a million of dollars, as the amount that might be expended at each crossing point for appliances which would enable trains to pass the crossings at full speed."

The author then proceeds to say, and I invite especial attention to this point:

"The above results are made to depend as much as possible upon statistical figures. It is observable that *the only assumptions made* are, first, for the average miles per hour and second, for the average time lost in making the stop."

4.‡

Then follows another statement, which I will state briefly as follows:

Earnings for the year 1881 of all railroads in Ohio, divided into
Passenger $13,746,895 (*dd*).
And freight 32,076,089 (*ee*).
Total $45,822,984 (*v*).

Speed of passenger train, 1 mile in 2 min. (*ff*).
Speed of average freight train at 18 miles per hour, 1 mile in 3⅓ min. (*gg*).
Time lost by passenger train in making stop, 1½ min. (*hh*).
Time lost by freight train in making stop, 3 min. (*jj*).
Distance lost by passenger train in making stop $\frac{\text{is } 1.5 \text{ min.}}{2 \text{ min.}}$ $\frac{\text{lost in stop}}{\text{per mile}}$ = 0.75 miles (*kk*).
Distance lost by freight train in making stop is $\frac{3 \text{ min.}}{3\frac{1}{3} \text{ min.}}$ $\frac{\text{lost by stop}}{\text{per mile}}$ = 0.9 miles (*ll*).

"Hence (the author says), the cost of all the stops for the year for the average passenger train now considered will be *three-fourths the amount earned by one mile of road*," and

* Railroad Economics, p. 122.

* Railroad Economics, pp. 123-6.
† Report of Commissioner of Railroads of the state of Ohio for 1881; pp. 415, 416.
‡ Railroad Commissioners' Report for 1881, pp. 416, 417.

for freight trains nine-tenths of the amount earned by one mile of road from freight.

"Dividing the total passenger earnings, by the miles of road we have $\frac{\$13,746,895}{5,835} = \$2,356$ (*m m*) for the passenger earnings of the average mile of railway in the state."

Likewise, the freight earnings for the average mile are $\frac{\$32,076,089}{5,835} = \$5,428$ (*n n*)

"Hence, ¼ of $2,356 (*m m*) = $1,767 (*o o*), the cost of the passenger train stops at the one average crossing for the year, for one road," and for the freight 0.9 (*l l*) × $5,428 = $4,885 (*p p*) is the annual cost of stopping all freight trains on one road at a single crossing.

As two roads participate in each crossing, these results must be doubled, and we have as the cost of stops made at each average crossing:

For passenger trains	$1,767 × 2 = $3,534 (*qq*)
For freight trains	4,885 × 2 = 9,770 (*rr*)
Total	$13,304 (*ss*)

"Putting these into capital at 6 per cent.

We have, for passenger trains	$58,900
And for freight trains	162,840
And "we obtain a total of	$221.740 (*tt*)

"as the amount of capital that could be invested at six per cent. at the average railway grade crossing in Ohio, for appliances or means to avoid the stop."

The author then proceeds to say:

"This figure is about a third less than the one previously given from other data. But it is obtained in a more direct and convincing course, *because there are but two steps in the reasoning*, viz., first, the running distance that the stop costs, and, second, the earnings per mile per year. *When examined closely, it will be seen to be the minimum figure allowable as an estimate.*"*

5.*

Then follows a statement of the cost of such stops, based upon alleged data furnished by some railroad officials, and obtained from time tables of three Ohio railroads, which is on the same general basis as the last, but differs in its data, as follows:

(*ff*) Speed of passenger trains, 1 mile in	2¼	minutes (*u u*)
(*g g*) " freight " 1 "	4 87/100	" (*v v*)
(*h h*) Time lost by pass. train at each stop	2½	" (*w w*)
(*j j*) " " freight " "	7	" (*x x*)
(*k k*) Distance lost by pass. train	2.5/2.25 = 1,111	miles (*y y*)
(*l l*) " " freight "	7./4.87 = 1.44	" (*z z*)

(*o o*) Earnings of average mile by pass. trains	$2,356 (*m m*)
× 1.111 = cost of pass. train stops	2,608 (*a b*)
(*p p*) Earnings of average mile by freight	5,428 (*n n*)
× 1.44 = cost of freight train stops	7,806 (*a c*)

This must be taken as before, for two roads and gives as the cost at each crossing

(*q q*) For stopping pass. trains	$2,608 (*a b*) × 2 = $5,216 (*a d*)
(*r r*) " " freight "	7,806 (*a c*) × 2 = 15,612 (*a e*)
(*s s*) Total for all trains	$20,828 (*a f*)

These amounts capitalized at 6 per cent.

(*t t*) Amount to, for pass. trains	$86,860 (*a g*)
(*u u*) " " freight "	260.200 (*a h*)
(*v v*) A total of	$347,060 (*a j*)

"For securing such appliances as will enable trains to pass the crossing at speed."

"This figure very nearly agrees with the result of the first calculation (3), and confirms the stated conviction that the second calculation (4) must be regarded as the minimum estimate."

"The cost of a single stop, for the last two calculations may be obtained by dividing the annual cost of the stops, for one road at one crossing, by the days 330 to the year and by the trains over each mile 17.03 (*j*). Hence for the second calculation (4) the single stops costs

$$\frac{6.652\left(\frac{ss}{2}\right)}{330 \times 17.03\ (j)} = \$1.18\ (a\ k);$$

and for the third calculation (5) the single stop costs

$$\frac{10.414\left(\frac{a\ f}{2}\right)}{330 \times 17.03\ (f)} = 1.85\ (a\ l).$$

6.†

Lastly, the author quotes a letter of Mr. Charles Latimer, M. Am. Soc. C. E., to him, in which Mr. L. calculates the momentum on the basis of the following data for an average crossing:

Passenger trains daily, 10 of 10 cars each, running at 50 miles per hour (*a m*).

Freight trains daily, 25 of 50 cars each, running at 25 miles per hour (*a n*).

From which data Mr. L. computes the cost of the stops at a crossing, per year of 360 days:

For 10 passenger trains, 10 cars each.	100 cars =	$8,543 (*a o*)
" 25 freight trains, 50 cars each	1,250 " =	5,210 (*a p*)
Total	1.35	1,350	$13,750 (*a q*)

And adds: "In order to arrive at a moderate conclusion which is susceptible of proof in a different way, we will take a mean between the two values above, which would be $6,875." Why he "takes a mean" between two factors which are to be added together, Mr. L. does not explain, and I cannot even surmise.

The average cost per train stop, according to Mr. Latimer's calculation, would be

$$\frac{\$13,750\ (a\ q)}{35 \times 360} = \$1.09\ (a\ r).$$

Our author takes Mr. Latimer's data and results, and arranges them thus:

	Cars.	Trains daily.	Annual cost.
"For passenger trains	10	10	$8,540 (*a s*)
" freight "	50	25	5,210 (*a t*)
Averages	30	17½	$6,875 (*a u*)

"From these figures (he says) it appears that for 30 cars

* Railroad Commissioners Report, pp. 418, 419.
† Ohio Railroad Commissioners report, pp. 429, 421.

to the train, 17½ trains per day, the total annual cost of the stops at a crossing for one of the roads intersecting is $6,875."

By reference to the last line of my statement of Mr. Latimer's results (*a q*) it will be seen that the 35 trains he assumes to have 1,350 cars, so that if it be admissible to average passenger trains and cars with freight trains and cars, the actual average number of cars per train is 38.57+ (*av*).

Our author then proceeds to argue that even when making the calculation on the "dynamic" basis used by Mr. Latimer, the earnings per train mile and not the expenses per train mile should be taken as the basis, and he accordingly figures out (with the error as to Mr. Latimer's average cars per train, included in his calculation, and which I will not follow in detail) that he gets "$7.411 (*aw*) as the result according to Mr. Latimer's dynamic method, for the annual cost of stops to one of the intersecting roads at the average Ohio crossing."

Doubling $7,411 = $14,822 (*ax*), which is the annual cost for both roads, which being capitalized at 6 per cent., "the cost of appliances for enabling both the intersecting roads to pass the crossing at speed is found to be $247,033 (*ay*)." (The appliances are evidently too costly for adoption if this is true).

The average cost per train stop he puts at

$\frac{\$7,411\ (aw)}{(j)\ 17.03 \times 330\ \text{days}} = \$1.32$ (*az*), ignoring the trifling facts

that he takes Mr. Latimer's data and results for a year of 360 days, at the speed of 50 miles per hour for passenger and 25 miles per hour for freight trains, an average of 32 15/100 miles per hour, and then divides his results over only 330 days for trains running at his assumed average speed of 14 3/10 miles per hour.

SUMMARY.

To compare the author's several "results," I will ascertain, according to the method he employs, the cost per train stop, on the basis first assumed of $100 per day (*a*) for the annual cost to one road of the stop at one crossing. By dividing that by the number of trains per day, we have $\frac{\$100\ (a)}{17.03\ (j)} = 5.87$ (*ba*). But it may be objected that the author does not adopt the "estimate" (*j*) of $100 per day for the average railroad, but only for "some roads." If we therefore, assume it to apply to the Pittsburgh, Fort Wayne & Chicago Railway, whose trains averaged over their whole line, in 1881, 30.14 trains each way, or 60.28 (*bc*) per day, we would have as the cost of each stop $\frac{\$100\ (a)}{60.28\ (bc)} = \$1.66$ (*t d*).

I then construct from the foregoing results of our author the following comparative table of "cost per train stop" and capitalized value per annum for each average crossing:

Calculation. Number.	Cost per stop. Reference.	Amount.	Capitalized value Reference.	Amount.
1	*bd*	$1.66*	*c*	$500,000
2	*r*	1.28	*u*	239,120
3	*z*	1.77	*cc*	330,393
4	*ak*	1.18	*tt*	221.740
5	*al*	1.85	*aj*	347,060
6	*az*	1.32	*ay*	247,033
Latimer	*ar*	1.09		

*My calculation from the author's assumed cost per day.

What would be thought of an engineer who, being asked to estimate the cost of a tunnel, should reply:

Some engineers would estimate it at from $100 to $500 a foot. "We will probably be entirely safe in basing our figures on the lesser amount, as true for a great number of" tunnels, and I place it at $500,000 (*c*). But, as "more definite figures on this point may be found of interest," I have made an elaborate calculation and make it $239,000 (*u*), but after giving that out he finds another "datum," and makes other "more definite figures," which he gives to another party, placing the cost of the same tunnel at $330,000 (*cc*). Again, by another process, he finds it should cost only $222,000 (*tt*), which "will be seen to be the minimum figure allowable as an estimate."

But meeting an old contractor, and learning that they sometimes have to wait for the smoke to clear away after a blast, for 7 minutes instead of 2½ minutes as he had previously calculated, thereby entailing a greater loss of time, and as all lost time ought to be calculated for at the rate that the contractor could make per minute, including his profits, if the men had continued working at full speed, he again figures out a cost of $347,000 (*a j*).

He notes with great satisfaction, that "This figure very nearly agrees with the result of the first calculation (*cc*) and confirms the stated conviction that the second calculation (*tt*) must be regarded as the minimum estimate."

Finally, he hears of a "dynamite plan" of constructing tunnels, and although the "dynamite" man estimates that he can do the work for $200,000, our engineer makes his own calculation and arrives at a sixth sum of $247,000 (*ay*).

While on the subject of tunnels, it may be noted, that the author in his preliminary "fly" at the question of capitalized value, etc., when he reaches the sum of $500,000 (*c*) says: "This money would cut about a mile of tunnel." How valuable would this information have been to the promoters of the Hudson River Tunnel could they have had it in a concrete form a year ago? What a statement for a professor of engineering, without reservation as to material or circumstance? I am informed that the Weehawken Tunnel of the West Shore Railway cost about $200 per foot, equal to about $1,050,000 per mile.

It is commonly said that "Figures won't lie!" But a simple inspection of the foregoing statements would almost make pardonable the conclusion that Ananias invented the multiplication table, although the record shows that he did not appreciate "division!"

I will take up the author's statements in their order and briefly as possible show their fallacy.

1.

The "estimate" of $100 to $500 per day, as the expense at a single crossing is the baldest of guessing! Taking the Pittsburgh, Fort Wayne & Chicago Railway as an instance, with its average of 30 trains daily each way, and which has to my knowledge 29 grade railroad crossings, and the cost at $100 per day each for 330 days would be:

$$330 \times \$100 \times 29 = \$857,000$$

per annum, for *stopping trains at crossings.*

The whole operating expenses (exclusive of "general expenses") of this railway of 468 miles length, were, for 1881, $5,449,136.14, of which sum $857,000 is 15.72 per cent. Does any one believe that it cost that company for each train run over its road 15.72 per cent. of the whole cost of operating and maintenance of engines, cars and track chargeable to that train, for stopping it at 29 grade crossings? That is too absurd for further consideration, as the author evidently thought when he went in quest of "more definite figures."

It may be here noted, that a large proportion of the crossings reported—probably over one-half—are at stations where nearly all trains must stop for traffic, and as to them, only the brief time taken in "stopping for crossing" can be regarded as "lost," and the time lost in slowing speed and in regaining speed being chargeable to the station stop. This the author makes no allowance for.

2.

Assuming the data for this computation (excepting the gross earnings) to be correct, the great and indefensible assumption is contained in the words, "By avoiding this stop, it appears Ohio roads could increase their daily earnings by over 5 per cent. of their actual earnings, etc." Where and how does it so appear? What data does the author bring forward to show that more passengers were ready to be transported, if the passenger trains had not stopped at the railroad crossings, or that freight was awaiting shipment and could not get off because the freight trains consumed 5.176 per cent. of their time in such stops? It does not so appear. By another assumption, still less supported by facts, the author transmutes earnings "in posse" into expenses "in esse," for the word "cost" must be held synonymous with "expense." The words "cost" and "expense" when applied to railroad statistics have a well settled technical meaning: they cover the actual "outgo" as distinguished from "income." Courts invariably hold that "prospective profits" cannot be proven as damages, yet the author characterizes alleged possible profits, that are not even "prospective," as "cost."

3.

This calculation, as stated, differs from No. 2 only in the change made by the increase in the item of gross earnings of all the railroads in Ohio for the year 1881 (*v*). It is a proof of the fallacy of the author's calculation, that the more Ohio railroads earn (without increasing the number of trains,) the more it "costs" for crossing stops, so that if the rates obtained for traffic were doubled, and the trains remained the same, the "cost" of stopping at grade crossings would be doubled.

Suppose we try the effect of the "*reductio ad absurdum.*" If stops averaging 23.1 (*h*) miles apart cost a sum equal to 5.176 (*n*) per cent. of the earnings, then stops averaging 1.155 miles apart, being 20 times as numerous, would cost a sum equal to 103.52 per cent. of the earnings! The trains on the Sixth Avenue Elevated Railroad in New York city stop 14 times in 5¼ miles, averaging ⅜ mile apart, while stops less than a mile apart are quite common where so called "accommodation trains" are run. According to the author, they are all run at an average loss.

4.

This calculation differs from the preceding only because the assumed loss of time in the stops is reduced. It is open to all the objections stated against Nos. 2 and 3, as to the assumptions, except that being lower, the results are by so much nearer the fact. The reason given for preferring it, "because there are but two steps in the reasoning," would still better apply to a simple "guess" at the cost, which requires but one "step in the reasoning."

5.

This calculation differs again only because the *assumed data* are changed, making the time of stops longer as compared with the running time per mile.

The fact that it very nearly agrees with a previous "result" is the only source of satisfaction to be found in it, and the fact that it is about 55 per cent. greater than the last preceding calculation (4) "confirms" the latter—but how? The author leaves it to be inferred. I conclude it must be owing to what the late A. L. Holley called the "factor of ignorance."

6.

This is like "stealing the livery of heaven to serve the devil in," for the author to appropriate Mr. Latimer's dynamic theory, and apply it to what he terms "the Ohio average figures," on what we may term "the Ohio plan,' and bring out a result which nearly "confirms" the "minimum estimate." As Mr. Latimer's plan applied to "the Ohio average figures" would have produced a less "minimum," it clearly needed to be corrected.

I will quote from the author for the last time, to show his process of reasoning, for adopting the *earnings* as the basis of cost.

* "Again, Mr. Latimer has used 75 cents as the cost of the

*Ohio Commissioners' Report, pp. 420, 421.

'train mile," while in the preceding calculations I used the *earnings* per train mile.

"A little reflection will show that for the present purpose the latter is correct, since whether the train stops from one to five minutes or goes ahead the same cost is entailed. Indeed, to consume five minutes in stopping and regaining speed there is probably even greater expenditure for steam, wear and tear than in going ahead. As men and cars are on duty the same, whether going ahead or not, it appears that the cost of the run that would be made in the absence of the stop is fully experienced, even exceeded, so that the difference in count, to the railroad company, is a shortage in about a mile of earnings, for which the cost is actually paid.

"Hence, the avoidance of the stops for a year may safely and fairly be regarded as resulting in a gain in earnings for a given cost, or, in other words, that the cost of the stops is in the form of earnings rather than in the form of actual expenditure.

"Hence, instead of 75 cents Mr. Latimer should have used in his calculation the earnings of the train mile."

One knows not which to admire most in the foregoing, the syntax or the ethics.

"Cars on duty" and a "Mile of earnings" are certainly unique, while the manner in which the author brings forward his "Hence" as winding up a perfect syllogism, is refreshing to one who after much "reflection" can see neither logic in his reasoning nor reason in his logic.

The author does not touch the data which would go to determine the "cost" of crossing stops, but consistently ignores them. Mr. Latimer sets forth his idea of how that cost is to be calculated, but the author shuns all questions of "actual expenditure," and in so doing leaves no excuse for his attempt to show why it would be economical to avoid the "know-nothing stop."

Herbert Spencer defines "science" as "definite knowledge in contradiction to that indefinite knowledge possessed by the uncultured." The calculations of our author are certainly not within the domain of science.

It will be asked whether I will accept Mr. Latimer's calculation, to which I say, No! He admits it is too high when he proposes to "average;" and while there is some reason for approving his plan in part, his calculation must be considerably modified. I cannot undertake in this paper (which is already too long), to criticise it in detail, much less can I now undertake to show what is the actual or approximate cost of the grade crossing stop, for which, as before stated, I have at present neither the time, space nor data to do it justice.

WM. P. SHINN, M. Am. Soc. C. E.

Narrow-Gauge "Shunting" Engine.

We publish this week general views (taken from *Engineering*) of a narrow-gauge "shunting" engine in use at Guinness' Brewery, Dublin, which presents peculiarities of construction which are worthy of study. The detail drawings and full description will appear next week.

Master Car-Builders' Association.

The following is a list of subjects to be considered with the committees appointed to report thereon at the next annual convention of the Master Car-Builders' Association, to be held in Chicago on the second Tuesday in June, 1883.

1. *On Links and Pins.*—The Committee to recommend a standard form and proportions for coupling links and pins. Howard Fry, New York, West Shore & Buffalo Railway Mills Building, 15 Broad street, New York, Richard Soule and Sanford Keeler.

2. *On Iron Cars.*—The Committee to report whether it would be profitable to railroad companies to substitute iron or steel for wood in the construction of any, and if so which, of the parts of cars now made of wood. W. R. Davenport, Erie Car Works, Erie, Pa., E. A. Olmstead.

3. *On a Standard Wheel Gauge and Form of Section for the Treads and Flanges of Wheels.*—The Committee to report which action, if any, is required with reference to the adoption of a standard wheel gauge, and to recommend a standard form of section for the treads and flanges of wheels, and whether experience indicates that any advantage results from the use of a conical form for the treads of wheels, and if so, how the advantage is shown. R. C. Blackall, Delaware & Hudson Canal Co., Albany, N. Y., D. Hoit and Edward B. Wall.

4. *On Sharp Flanges.*—Their cause and prevention. H. Stanley Goodwin, Lehigh Valley Railroad, Bethlehem, Pa.

5. *On the Causes of Accidents to Trainmen.*—The Committee to report what means can and should be provided to protect train and yardmen from injury. W. F. Turreff, Cleveland, Columbus, Cincinnati & Indianapolis Railway Cleveland, O., John Kirby and Wm. Fuller.

6. *On the Most Economical Carrying Capacity for Freight Cars.*—The Committee to report what are safe and economical loads for axles of given sizes. John Kirby, Lake Shore & Michigan Southern Railway, Cleveland, O., Wm. Fuller.

7. *On the Economy of Grinding Cast-Iron Car Wheels.*—L. Packard, Baltimore & Ohio Railroad, Baltimore, Md., D. C. Richardson and John Hodges.

8. *On Steel-Tired Wheels with Wrought-Iron Centres.*—The committee to report on their safety and cost of service compared with chilled cast-iron and paper wheels. F. D. Adams, Boston & Albany Railroad, Allston, Mass., J. W. Marden.

9. *On Refrigerator Cars.*—The Committee to report what it knows or can learn on that subject, and whether it is more economical for railroad companies to own and run such cars or whether they should be controlled by other companies and their employés. Thos. Aylesbury, Kansas City, St. Joseph & Council Bluffs Railroad, St. Joseph, Mo., Jos. Townsend and C. E. Gore.

10. *On Heating Cars.*—The Committee to report what are the elements of safety, economy and comfort in various methods of heating cars. J. N. Milham, New York, Lake Erie & Western Railroad, Jersey City, N. J., C. E. Garey and J. W. Marden.

11. *On Standard Freight and Passenger Car Trucks.*—Wm. McWood, Grand Trunk Railway, Montreal, Canada., Robt. Miller.

12. *On the Decoration and Furnishing of Passenger Cars.*—The Committee to indicate the principles which should control the interior and exterior decoration of passenger cars, and how both it and the comfort of cars may be be improved. T. A. Bissell, Barney & Smith Manufacturing Co., Dayton, O., J. S. Lentz and W. B. Snow.

Fig. 1.

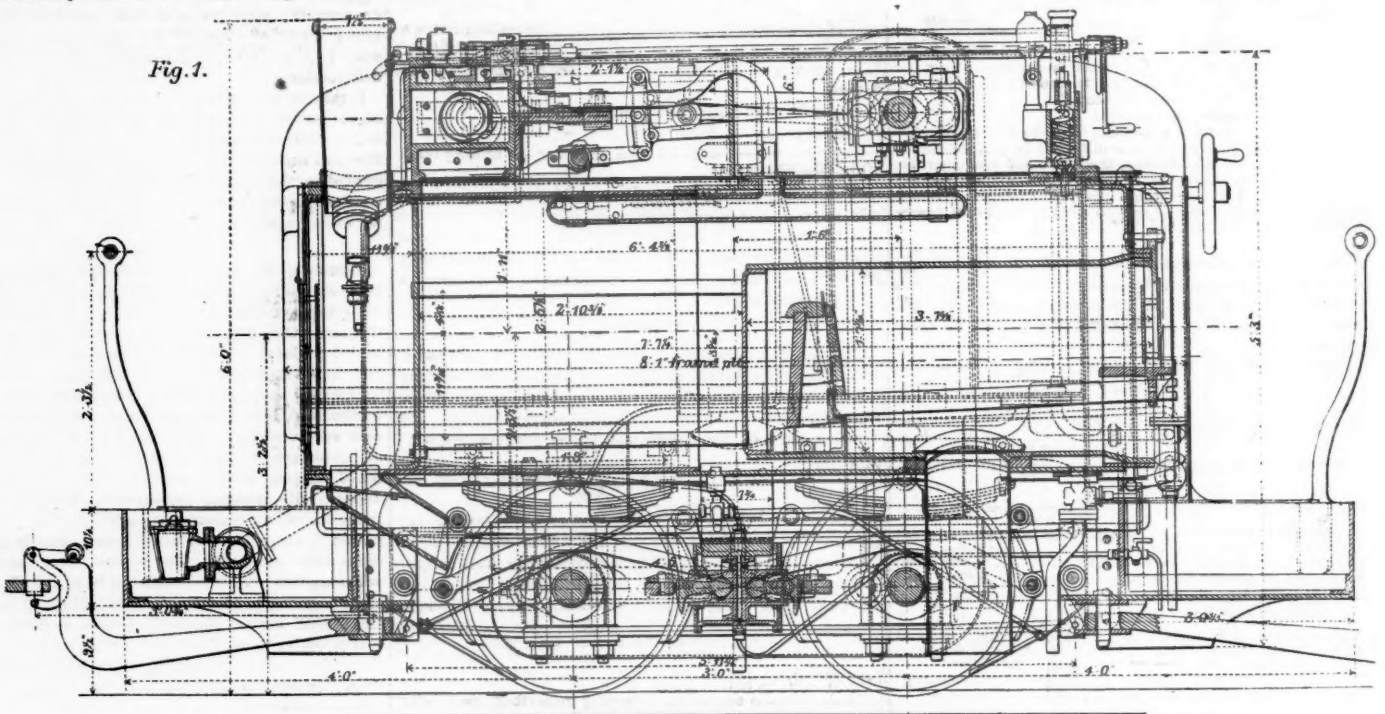
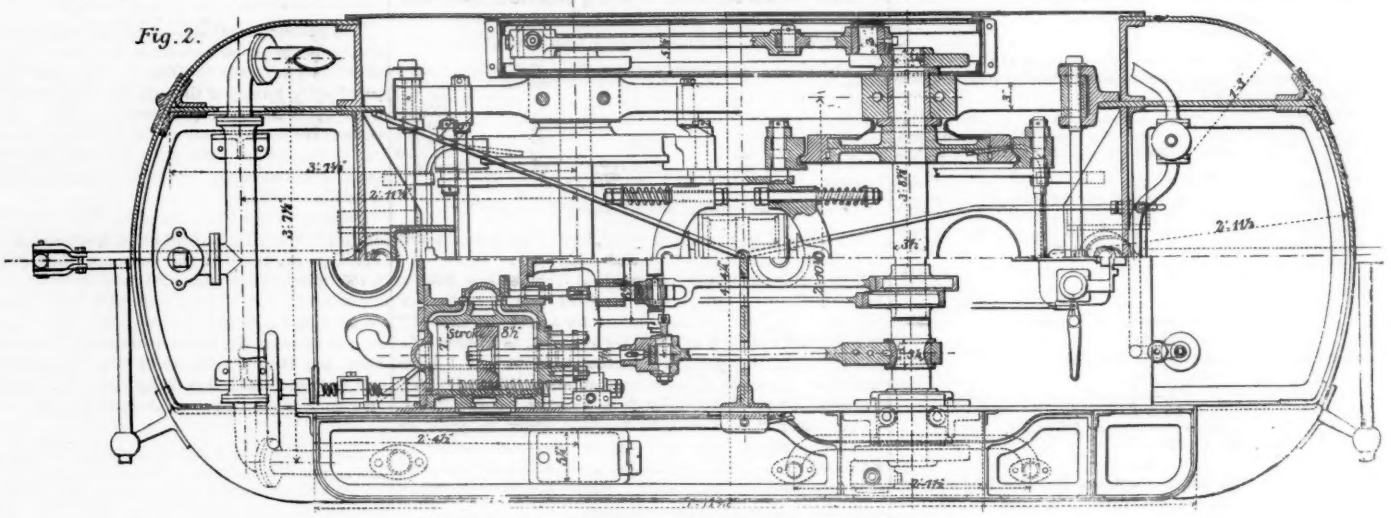


Fig. 2.



NARROW GAUGE "SHUNTING" ENGINE.

AT MESSRS. A. GUINNES,S SON & CO.'S BREWERY, DUBLIN,

Constructed by the AVONSIDE ENGINE COMPANY, *Bristol.* *From the designs of* MR. S. GEOGHEGAN, *Engineer, Dublin.*

13. *On Brake Shoes, Brake-Beams and the Interchangeable parts of the Brake Arrangements of Cars.*—Howard Fry, New York, West Shore & Buffalo Railway, Mills Building, 15 Broad St., New York, J. S. Lentz, F. M. Wilder.

December Meeting of the Master Car-Builders' Club.

This meeting was held Dec. 21, and was called to order by Mr. Leander Garey, who announced that the subject for discussion was "Gauges for Measuring Screw-cutting Tools and Standard Sizes of Bar Iron." In order to show the difficulty of securing interchangeability in bolts and nuts, one of the members was requested to read part of a paper by Mr. O. Chanute, which was prepared for the American Society of Civil Engineers, and read at one of its meetings. The following is the portion relating to screw threads:

II.—SCREW-THREADS.

[*From a paper entitled "Uniformity in Railway Rolling Stock," by O. Chanute, Chief Engineer New York, Lake Erie & Western Railroad, read before the American Society of Civil Engineers, June 21, 1882.*]

As American cars, apart from the trucks or running gear, chiefly consist of wood, and the various wooden parts are principally fastened together with bolts, the factor which becomes important in securing promptness and economy of repair is that the threads upon the bolts, and those upon the

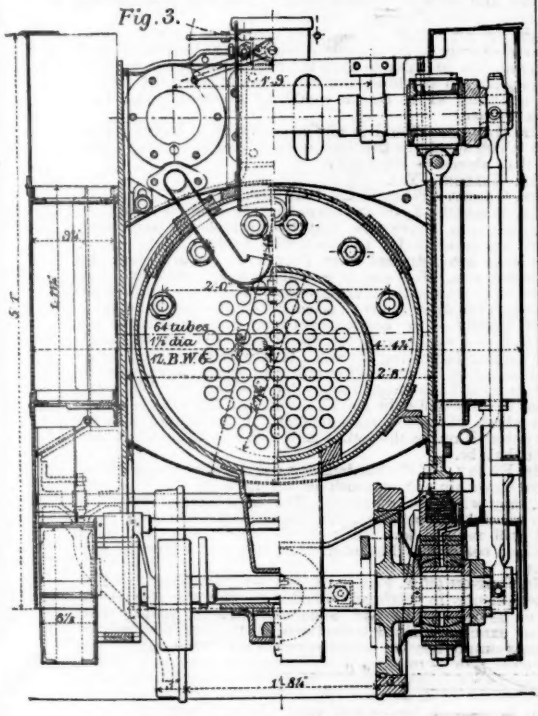
nuts designed to go upon them shall, for the same sizes, be a good fit, and absolutely uniform and interchangeable. Wood can be cut and fitted with ordinary tools, but a nut too small cannot be screwed up home, and if it be loose it is pretty sure to rattle off.

In contracting for all new cars and engines, therefore, the New York, Lake Erie & Western Railroad carefully specified that the builders should exclusively furnish threads of the "United States" (or Franklin Institute) standard; but at the same time, the mechanical department thought it well to look at home, to see how the matter stood in its own shops.

In 1873 the road had nominally adopted the "United States" system and standard of screw-threads. It had procured a number of sample taps and dies and furnished a set to each shop, with instructions to reproduce them as required by the wearing out of the old sets.

In 1877, or only seven years after the adoption of this standard upon the Erie Railway, it was discovered that nuts cut at some of its shops did not properly fit bolts of the same diameter cut at other shops. The matter was then thoroughly investigated. A nut of each size was ordered cut at each tap with the top in common use and supposed to

Fig. 3.



Narrow Gauge "Shunting" Engine.

be standard, and these nuts were sent to the firm of Pratt & Whitney, Hartford, Conn., whose well-known accuracy and efforts to maintain mechanical precision gave assurance of thorough and correct results.

In their shop the corresponding bolt thread was reproduced by fitting a soft plug of Babbit metal to each nut. This was screwed in and out, being expanded, if necessary, by driving a steel mandril in a central hole left for that purpose until it fitted perfectly, and the plugs so obtained were used to make measurements of the screw-threads. Each nut was then cut open in the center and the half nut of each shop could then be tried upon the Babbit plug representing the bolt cut at another shop.

The result was surprising and the plugs and half nuts presented a series of misfits which require to be seen to be appreciated. They cannot well be represented on paper, but an examination of the pieces reveals the most serious differences. Neither the diameter, nor the pitch, nor the depth of the thread, nor their angles, nor the flat surfaces were found to agree.

Even in the pitch, or number of threads to the inch, they do not agree. This was accounted for by the fact that some of the shops had sent nuts cut with the tap used for *engine* bolts, while they had another tap with a different number of threads to the inch for *car* bolts, though why they should differ and how both could be the standard is not so apparent.

The table on the following page exhibits the discrepancies which were found to exist in the two most important particulars of pitch and diameter, and its careful inspection is required in order to appreciate the divergencies it shows.

It will be noticed that almost all the diameters are different, and that *not one is right*. The sizes are given in 10,000 of inches, and the errors vary from 17-10,000 up to 550-10,000, while every nut but one was found to be too large.

The fact was that each shop, in reproducing its taps and dies, had, by more or less imperceptible degrees, departed from the original standard. The diameter had been increased, the depth and angle of the thread had been altered, the flat surfaces at the top and bottom had been curtailed as was said before, and amply appears from an examination of the plugs and half-nuts, a bolt cut at one shop was not properly fitted by a nut cut at another.

Having thus found out some of its own deficiencies, the mechanical department next sought for what comfort it could get from those of its neighbors. For this purpose 22 nuts, all nominally of ¾-inch diameter, were unscrewed from as many cars belonging to 16 different railroad companies.

The result was, indeed, gratifying and instructive, and is shown upon the list of the sizes which were obtained.

SIZES OF ¾-INCH NUTS.

Owner of Car.	No. of Threads.	Diameter.
Standard nut should be	10	0.7500
Lake Shore & Michigan Southern L.R —1	10	0.7815
" " " 2	10	0.7637
" " " 3	10	0.7815
New York Central & Hudson River R.R.—1	10	0.7637
" " " " 2	10	0.7890
Flint & Pere Marquette R.R.—1	10	0.7815
" " 2	10	0.7637
Lehigh Valley R.R, 1877	10	0.7815
Philadelphia & Reading R.R	10	0.7637
Cleveland, Columbus & Cincinnati R.R —1	10	0.7815
" " 2	10	0.7815
Erie Railway, 1876	10	0.7890
Michigan Central R.R	10	0.7815
Grand Trunk Railway—1	10	0.7815
" " 2	10	0.7815
Chicago & Northwestern R.R	10	0.7815
Toledo, Peoria & Warsaw R.R	10	0.7815
Chicago, Milwaukee & St. Paul R.R	10	0.7815
Toledo, Wabash & Western R.R	10	0.7815
Pekin, Lincoln & Decatur R.R	10	0.7815
Cincinnati, Lafayette & Chicago R.R	10	0.7815
North Pennsylvania R.R	10	0.7815

It will again be noticed from this list, that not a single nut was found to be of the correct diameter, although there are but three different sizes. A great number of sizes could probably have been found, by examining more cars, the above having been selected haphazard, but that was not what was being sought.

The object was to know how the sizes ran, and it will be seen that all the nuts were too large, both on foreign roads and in the Erie shops, with the single exception of one nut from the Hornellsville shop.

In fact, it was ascertained that the practice was all but universal of cutting nuts over size, especially for car work, and that the Erie Railway had merely followed the general drift in departing from the standard.

It was found that there were three reasons for this state of affairs.

1st. That the sizes of bolts on foreign cars were generally larger than the standard, and the Erie nuts had to be cut over size in order to fit them.

2d. That, as there were several different over sizes, the nuts were cut loose, so as to go on the larger bolts. This resulted in bad fits and much shaking off of nuts.

3d. That most of the iron delivered by the rolling mills was over size, and in order to avoid the expense of going over a bolt twice, in cutting the thread, the practice obtained of cutting all rough bolts over size.

Indeed, so universally had these causes operated, that in 1876, only 12 years after the making of the original standard of screw-threads, the makers of taps and dies systematically made them over size, and had even formulated a rule attempting to regulate this inaccuracy, that:

"Up to and including ⅝-inch diameter, the size of nuts shall be $\frac{1}{64}$ over the standard. Above ⅝-inch, they shall be $\frac{1}{32}$ large."

That is to say, a certain standard system was devised, it was nominally adopted by almost all the parties interested, including the railroads, and a rule was then straightway formulated to depart from that standard in one of its most important particulars.

It was stated by the makers of taps and dies that prior to the recent reform in this matter, due to the efforts of the master car-builders, about three-fourths of their sales of taps and dies consisted of those which were over size.

Now, the effect of this practice was twofold, so far as car repairs were concerned:

First.—The roads did not adhere to the same amount of over size, as fully appears from the dimension of nuts on the Erie Railway, and on the several cars, a list of which has been given, and although the differences may be thought small, they are quite large enough either to prevent a nut from going on a bolt at all or to leave it so loose as easily to rattle off.

When, therefore, a car arrived at a shop, with a nut gone, instead of putting on at once a standard nut, investigation had to be made as to the amount of over size used by the road or firm which built the car. If this differed from the particular inaccuracy practiced by the road doing the repairs, recourse must needs be had to the "old nut barrel," and here the trouble commenced.

"The old nut barrel" contained the many hundred specimens of nuts of different sizes which had been taken off from foreign cars. They were picked over and tried on, one at a time, with whatever patience or profanity the workman might be master of, until one was found to fit. This fit was almost sure to be a loose one, but the nut was, nevertheless, screwed up, and the car sent off with a fastening tolerably certain to work off, and to give some other road a chance to overhaul its "old nut barrel." If no nut was found to go on; if a bad fit could not be made in that way, the old bolt was knocked out and a new bolt (cut to a different oversize) was inserted, to plague somebody else. Thus much of the car repairs took tenfold the time and caused tenfold the expense which would have been incurred if all the roads had rigidly adhered to the standard which they had nominally adopted, and made their screw-threads of exact sizes.

The second effect of over-sizes was that the roads paid for more iron than they ordered or required. The rolling mills for actual weights, by the pound, there was no objection so far as they were concerned in making the bars as large as would be acceptable to the customers.

Several lots of iron were then measured at the Erie shops, and they were found to run from $\frac{1}{32}$ to $\frac{1}{64}$ of an inch over size. The over weight seemed to average about 8½ per cent. Now, the Erie Railway had during the year 1877, cut about 700,000 lbs. of round iron into bolts, and if the over weight be assumed at 5 per cent. (instead of 8½ per cent.), it had probably paid for some 35,000 lbs. of iron, worth, at three cents a pound, $1,050 more than it required.

Moreover, it appeared by investigation, that it was costing $1,822 a year to maintain this bad system of inaccuracy by making the taps and dies in the company's own shops, and that these could be purchased for less money from makers who made a specialty of maintaining uniform accuracy.

It then had become so clear that only annoyance, bad workmanship, and expense resulted from the continuance of the existing practice of making the taps and dies in the company's own shops, that it was determined to discontinue this and to come down to exact standard sizes as soon as possible. Accordingly, in October, 1878, the following order was issued:

"In order to preserve uniformity in screw-threads the following rules shall hereafter govern:

"1st. All new taps, master-taps, and such dies as are not attached to machines required for regular use shall hereafter be procured upon requisitions instead of being made at each shop as wanted. The workman hitherto doing such work shall be relieved or assigned to other duties.

"Taps for special work may either be made or ordered, as circumstances will warrant.

"New taps and dies shall, however, be ordered only when actually required for use, and the present supply shall be utilized until worn out.

"2. All new engines and cars shall be constructed with screw-threads, bolt heads, and nuts in exact conformity with the United States standard known as the 'Franklin Institute' or 'Sellers'' system.

"3. All iron and steel received for bolts shall be carefully inspected to make sure that it does not run over or under size, and bars involving double cutting, or too small, shall be rejected.

"4th. All new bolts, etc., for the repair of the existing rolling stock, shall be cut to the exact standard sizes, except in cases where great expense or inconvenience would result therefrom.

"5th. Such of the existing taps and dies as may be found to differ from the exact standard, shall be used only to duplicate existing threads in repairs of the rolling stock and only so far as necessary to prevent waste or extra expense."

But the Erie experience did not stop here. It next obtained some lots of taps and dies from different makers, both those of which were supposed to be of exact and those which were made over size, in accordance with the curious rule which has been mentioned. These lots were compared, and it was found that the taps and dies made by different makers did not agree as to size.

These several makers had been saying for some time that the road could not hope to maintain standard sizes in its own shops. That absolute accuracy required special appliances, which these makers had obtained at great cost, and that it was, therefore, better to buy all taps and dies of them. Now, it was discovered that the product of different makers did not coincide, and that if the road purchased of one firm and wanted to preserve a standard, it could not purchase of the other.

Next, the cause of this difference was inquired into, and the makers of taps and dies said that they did not know. One firm stated that it had spent two years in time, and over $10,000 in money, in obtaining the exact measurement of an inch, and its multiples and fractions, from the standard yard, deposited at Washington. The other firm said that they had most faithfully copied the original gauges recognized as correct, and made for the United States Government several years before, by a most careful and accurate mechanic of Massachusetts, named Fox; and that there was a standard set in the Brooklyn Navy Yard, to witness their assertion.

Here was at last a gleam of light. The inquiry led back to the original standard. The makers of these uninterchangeable taps and dies were accordingly told to bring down their standard gauges to the Brooklyn Navy Yard, and they would all be compared together.

This was done, and the result was apparently to make confusion worse confounded. The three sets of gauges did not agree with each other. It is true that the differences were not great, being at most 1-1000 of an inch, and such that while they could be measured by instruments of precision, they cannot well be exhibited in a table; but the fact remained that the gauges were not interchangeable.

Perhaps some engineers, accustomed to measure to 1-100 of a foot, will say that 1-1000 of an inch is not much of a distance; and doubtless in some locations it may be neglected altogether. Yet if they will examine the ⅛-inch gauge and the two plugs, one exactly 1⅛-inch in diameter, and the other just 1-1000 of an inch smaller, made by Pratt & Whitney for Mr. Forney, of the *Railroad Gazette*, and kindly loaned by him, they will find that this 1-1000 of an inch makes just the difference between a close fit and a loose fit.

It may be said further, with respect to the comparison of the three sets of gauges, that those of the firm which had obtained its own measurements from the standard yard at Washington were found to be the most accurate; that next to these were the gauges of the other firm, and worst of all were those of the government at the Navy Yard. This was accounted for by the fact, that [illegible] made of soft iron they had worn in using, and the effects of such wear, in maintaining standard size, will be further alluded to hereafter. The two tap and die making firms had been careful to case-harden their gauges, and in one case they had been made adjustable to take up possible wear.

Having thus traced the differences connected with the screw-threads, through their range of many inaccuracies, even to a difference of original standards of measurements, the next step was to apply a remedy.

For this purpose a general meeting of the Master Car-Builders' Association was held in New York, on the 18th of December, 1879, to which were invited Mr. William Sellers, the originator of the American system of screw-threads, and the various manufacturers of taps and dies.

At this meeting the existing difficulties were explained, and the question was fully discussed.

It appeared that the master car-builders had all encountered the trouble, annoyance and expense resulting from the lack of uniformity in screw-threads, and were confident that a general reform in this respect would save hundreds of thousands of dollars annually to the railroads of the country.

On the other hand, the makers of taps and dies explained how great were the difficulties of maintaining, even the partial accuracy which they had secured, described their processes, and expressed their willingness to encounter further expense to secure greater correctness.

Mr. Sellers, being asked for his advice, gave it at length. He described the methods which had been employed in the shops of William Sellers & Co., to secure accuracy, and to

DIMENSIONS OF NUTS—ERIE RAILWAY.

Shop.	1 Inch.			⅞ Inch.			¾ Inch.			⅝ Inch.			½ Inch.		
	No. of Thread	Diameter	Difference.	No. of Thread	Diameter	Difference.	No. of Thread	Diameter	Difference.	No. of Thread	Diameter	Difference.	No. of Thread	Diameter	Difference.
Standard	8	1.0000	.....	9	0.8750	.....	10	0.7500	.....	11	0.6250	.....	13	0.5000	....
Jersey City	8	1.0040	0.0040	9	0.8780	0.0030	10	0.7530	0.0030	11	0.6280	0.0030	12	0.5025	0.0025
Eastern Car	8	1.0340	0.0340	9	0.9100	0.0350	10	0.7815	0.0315	11	0.6575	0.0325	13	0.5320	0.0320
Port Jervis	9	1.0082	0.0082	9	0.8880	0.0150	10	0.7620	0.0120	10	0.6370	0.0120	12	0.5102	0.0102
Susquehanna	8	1.0060	0.0060	9	0.8800	0.0050	10	0.7510	0.0010	11	0.6290	0.0040	13	0.5055	0.0055
Hornellsville	8	1.0017	0.0017	9	0.8875	0.0125	10	0.7535	0.0035	10	0.6190	0.0060	12	0.5020	0.0030
												Small.			
Buffalo Repair	8	1.0017	0.0017	9	0.8870	0.0120	10	0.7550	0.0050	11	0.6275	0.0025	13	0.5085	0.0085
Buffalo Car	8	1.0550	0.0550	9	0.9215	0.0465	10	0.7890	0.0390	11	0.6565	0.0315	....	.....	.....
Elmira Car	8	1.0175	0.0175	9	0.9000	0.0250	10	0.7637	0.0137	11	0.6350	0.0100	13	0.5175	0.0175

and the threads thus given more of a V-shape. Even where the right pitch had been used* it had been altered a little and all delivered iron over-size, and upon being consulted, their managers said that they did so because they thought that their customers preferred it. That there was some little additional trouble in rolling iron to exact sizes, and that it was safer to make it a little large, and that as they charged

* The nuts cut with a pitch differing from the U. S. standard were intended to fit bolts on old locomotives built with the arbitrary and differing systems of threads formerly prevailing.

inspect the dimensions of screw threads. He stated that his firm had found it more accurate and cheaper to buy their taps and dies than to continue their manufacture, and gave some very valuable hints as to the best methods to follow in future.

In consequence of this advice it was decided by the master car-builders to abandon the use of "over-sizes" completely in screw-threads, and to come down to the exact standard as soon as possible. A committee was subsequently appointed, with Mr. M. N. Forney as Chairman, which reported at the meeting just held, June 15, 1882, at which a resolution was adopted commending the reform to such railroads as have not yet carried it out.

The makers of taps and dies, on their side, agreed to make their gauges agree, and to use absolutely the same standards in manufacturing their goods.

The care of verifying and making these standards was entrusted to the firm of Pratt & Whitney, and it has now spent two years and a good deal of money in revising its former measurements, in devising and building, with the aid of Prof. W. A. Rogers, of the Cambridge Observatory, a new measuring machine to establish a standard inch, and in making accurate sets of gauges, which will be placed on the market in a month or two.

The difficulties they encountered in their pursuit of the standard inch will be found partially described in Mr. Forney's report to the master car-builders.

But after the standard gauges have been made there remain two difficulties to be overcome:

The first arises from the expansion and contraction of steel in tempering. After a screw tap has been made of soft steel, it is quite accurate, but before it can be used it requires hardening. In this process it becomes more or less distorted; so that with all possible care the taps of the same makers are not absolutely uniform. This was tested on the Erie Railway. A dozen taps were obtained from one maker, and a nut was tapped with each. They were then interchanged, and it was found that there were differences enough to make the taps run loose through some nuts and tight through others. This might be overcome by grinding the taps after hardening, but the cost would be prohibitory, and would be rendered nugatory by the second difficulty.

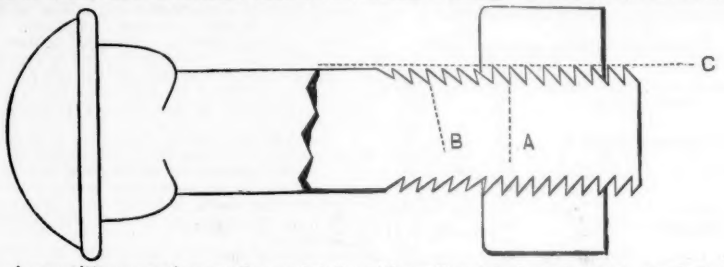
This difficulty results from the wear of the tap or the die in actual use. They may be absolutely correct when put in the machine, but with the first nut or bolt they begin to wear; and although that wear is minutely small it becomes appreciable in time, so that a nut cut with an old tap will hardly go on a bolt cut with an old die, and so tempt the workman to resort to over sizes and bad fits.

Impressed with these difficulties inventors have devised many ingenious contrivances to overcome their results.

It would carry us much too far to review the large family of "nut locks," which have been proposed, experimented on and discarded. Some few are effective, but they chiefly apply to track bolts, and are beyond the scope of this paper.

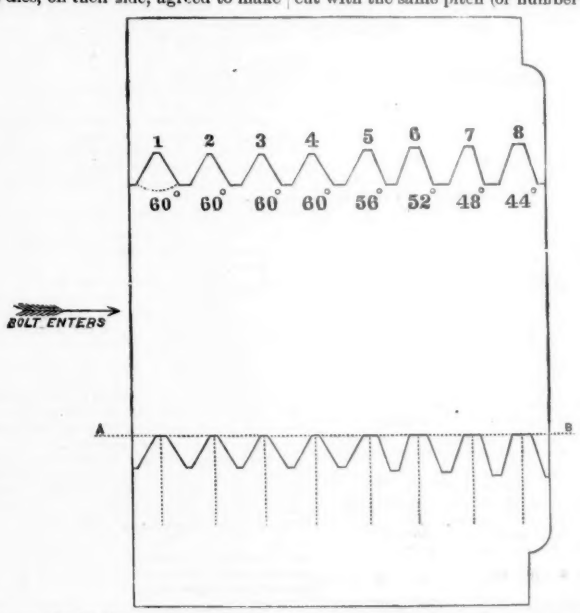
It is preferred to call attention to three attempts to make the bolts and nuts adjust themselves to each other, so as to produce a good fit, even if differing in original size.

The first is an English invention, that of Mr. Ibbotson. It consists in boring out the outer end of the nut, and filling it



with a soft metal, through which the bolt may thread its way, forcing the metal into a tight fit.

The second is the "grip bolt" of the Harvey Manufacturing Co., of which a cut is given herewith. In this, the thread of the bolt is under-cut at an acute angle, while the nut is cut with the same pitch (or number of threads per inch) but



with perpendicular surfaces on the inner edge of the threads. The effect of this is that when the nut is screwed on, it "upsets" the ends of the threads on the bolt and presses them into a close fit, and thus prevents the tendency to loosen.

This, however, is open to the objection that it introduces a new style and system of threads, and that these threads, being cut to thin edges, are apt to be injured.

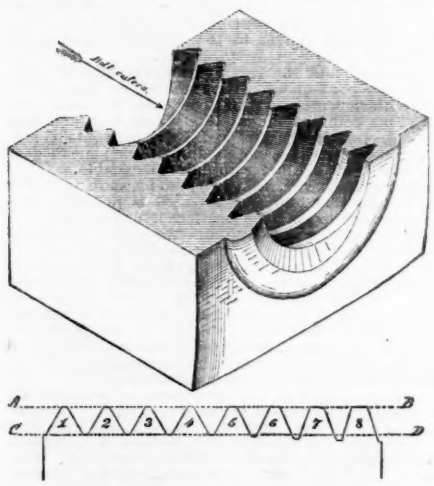
Mr. Harvey has, therefore, been led to invent the third device, in which the Sellers system of screw-threads is retained for the bolt, but the nut is so shaped as to plow its way into a close fit.

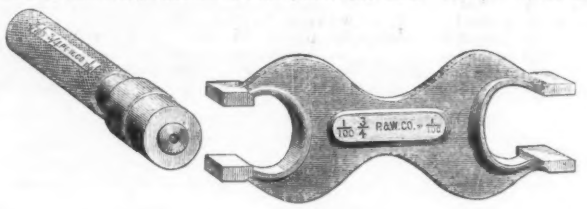
This is effected by cutting the first half of the nut to correspond with the standard thread of the bolt (making an easy fit), and by gradually changing the angle of the remaining threads through the second half of the nut, as shown upon the drawing herewith.* Thus the threads which are at an angle of 60 degrees with each other through the first half of the nut, become at an angle of 45 degrees at the rear end of the same nut, the intervening portion being "a spiral wedge, which, by means of the starting threads upon the nut, is made to enter the grooves of the bolt thread, and to compress and displace the metal." The threads upon the rear half of the nut being gradually deepened to make room for the flowing metal.

The effect of screwing such a nut on a bolt, is to pinch and squeeze the threads of the bolt, engaging (at a different angle) those in the rear half of the nut, to cause the metal to flow, and to force the bolt and nut to adjust themselves to each other. This undoubtedly secures tight fits, even when the bolts and nuts are cut to appreciably different sizes.

Whether this system will produce in practical use the excellent results which it promises, whether the straining of the metal beyond the limit of elasticity, to cause it to flow, will weaken the threads, or whether the threads will be so distorted when the nut has to be screwed on and off a number of times, as to eventually result in loose fits, experience and time must tell.

The object has been to point out the great economy and advantages which result in constructing railway rolling stock with absolutely interchangeable parts; the mechanical difficulties which stand in the way, and the devices which have been introduced to overcome them. It is hoped that these will engage the attention of this Society, and that its members will join in promoting the reform of past inaccuracies.





* Harvey Mfg. Co. Pat. Spiral Wedge or Self-fitting Nut (head section). *A* to *B* is straight line across the tops of the threads, showing that the nut is not a tapered one.

Threads numbered 1 to 4 are United States Standard, having an angle of 60°.

From Nos. 5 to 8 the angle of the thread is constantly changing, *i. e.*, it is growing more and more acute.

To preserve the standard number of threads to the inch, the tops of the threads are thickened as the threads become more acute.

These more acute threads are also deepened, giving room for the expansion of the bolt threads (of an angle of 60°) when this nut, with threads gradually growing more and more acute, is "wedged" into, or plows its way through them.

Three specimens of $\frac{3}{4}$-in. bolts which had been sent by Messrs. Hoopes & Townsend, of Philadelphia, were exhibited. These were all turned one of them to exact size and one $\frac{1}{100}$ in. larger and the other $\frac{1}{100}$ in. smaller. Each of them had a thread cut on it of standard size. The difference in the threads is quite perceptible, that on the smallest bolt was not quite full, while the largest was a little ragged on the edges, showing that a superfluous amount of metal had been cut away. Messrs. Hoopes & Townsend therefore concluded that bolt iron should not vary more than $\frac{1}{100}$ in. from standard sizes.

THE CHAIRMAN said that one of the objects of the meeting was to ascertain how near to standard sizes bolt iron could be rolled without increasing its cost. He requested Mr. Wilson (of Wilson, Walker & Co., Pittsburgh) to give his views.

MR. WILSON.—Iron can be rolled accurately to a given gauge; it is only a matter of cost, that is, of keeping the guides and rolls in perfect order. But the practice has been to order iron full, and that "full" had no limit. It might be an eighth or a thirty-second or a sixty-fourth. Iron of exactly $\frac{3}{4}$ in. or other diameter can be had if it is ordered, but in order to have the rolls turned up frequently and keep them absolutely correct, it would cost a little more. To maintain exact sizes it would be necessary to turn the rolls oftener.

MR. GAREY.—Would it not be necessary to have a size of iron which should be the limit, so that when it exceeded that the rolls should be returned?

MR. WILSON.—Yes.

MR. GAREY.—What should that limit be?

MR. WILSON.—I think whenever the iron is found to be $\frac{1}{64}$ or $\frac{1}{100}$ in. above size that the rolls should be dressed. That is a question for the men who use the iron to decide. Our rolls are returned when they are $\frac{1}{64}$ larger than the standard size. We are now using a steel guide and can make more iron without change than heretofore. Of course if we have to dress the rolls oftener we must charge more.

Mr. GAREY.—The car-builders want to learn what is the limit of least variation in the size of iron that can be specified without increasing its cost. If they required iron to be made of exact size the rolling mill men would have cause to say we must have more money for making it. What we want to do is to fix the least limit of variation in the size of iron which will not increase its cost. I do not see how we can get at it unless the rolling mill men can agree what that limit shall be.

Mr. EMERY.—If the car-builders require that iron shall be rolled to within a hundredth of an inch of the standard size, they will certainly get it. The bolts made from such iron will take 10 per cent. less material than is used now and will require less work to cut them, and the bolts will be a better fit. For such iron they can afford to pay more.

Mr. FRENCH (of A. French & Co.)—I think there will be little difficulty in getting iron rolled to exact size if you insist on having it. We had some difficulty in having steel rolled exactly when we commenced the manufacture of springs simply because manufacturers had been allowed to roll steel $\frac{1}{32}$ or $\frac{1}{64}$ in. large. We insisted in having it rolled to exact sizes, and we got it. We have every bar gauged, and I do not think we have rejected 500 lbs. of steel received from the manufacturers in a year. I do not see any reason why iron should not be rolled in the same way, and do not think it will cost any more to do it when manufacturers become accustomed to it.

MR. GAREY said he thought it would be necessary to have standard gauges for rolling iron, because otherwise in Pittsburgh, for example, the $\frac{1}{2}$, $\frac{3}{4}$ or $\frac{7}{8}$ in. might not be the same as in New York.

MR. FORNEY.—If I had an order for 100 tons of $\frac{3}{4}$ in. iron and should specify that the bars should enter the gauge on the table which, is $\frac{1}{100}$ in. larger than $\frac{3}{4}$, but should not enter the other, which is $\frac{1}{100}$ in. smaller than $\frac{3}{4}$ in., the difference between the two being $\frac{1}{50}$ in., would Mr. Wilson charge any more for the iron than he would if there was no specfication of that kind?

MR. WILSON.—No.

MR. FORNEY.—How close to standard sizes can you roll iron without increasing the cost? Can you roll within $\frac{1}{32}$, $\frac{1}{64}$ or $\frac{1}{100}$ in.? There must be some limit in the variation from standard sizes at which the cost is not increased. Now what is it?

MR. WILSON.—To roll iron to standard sizes we should require to have another set of rolls. At present chain iron is rolled scant, bolt iron is rolled full; now if we had orders to make iron to standard sizes we would require still another set of rolls. Car manufactures frequently say in their orders, "Please make this iron scant all over."

MR. FORNEY.—I have served for several years on the Committee on Standard Screw-threads, and one of the difficulties encountered in their introduction has been that of getting iron made to standard sizes. It was therefore proposed to the Pratt & Whitney Company that they should make limit gauges for the size of iron which could be used by the rolling-mill men in making and the railroad men in inspecting the iron. It was proposed to have one gauge a little larger than the standard size and the other a little smaller, and then specify that the iron should enter the one and not enter the other. Now, I will ask Mr. Wilson what he thinks the difference between the standard size and that of the gauges should be?

MR. WILSON.—I should say $\frac{1}{32}$ to $\frac{1}{100}$ larger and smaller than the standard would be a good margin to work on.

MR. GAREY.—How much time would it be necessary to give to the rolling-mills in order to have them supply iron rolled by such gauges? Would there be any difficulty in placing an order in January to be delivered in March?

MR. WILSON.—There would probably be no difficulty in delivering it in February.

A representative of the Albany & Rensselaer Iron & Steel Company said that if his company received orders sufficient to warrant it in getting the necessary rolls, it would roll the iron to the limit required. It has been its practice to roll bolt iron $\frac{1}{64}$ in. full. He suggested $\frac{1}{100}$ in. each way as the allowable limit, to be reduced in the smaller sizes.

MR. BURDICT (of Plumb, Burdict & Barnard, Bolt Manufacturers, Buffalo).—We use a great deal of iron in the manufacture of bolts. We furnish all the mills from which

we buy iron with gauges, and we allow them to vary from $\frac{1}{64}$ to $\frac{1}{100}$ in. It is almost a matter of impossibility to get iron to those sizes. I am glad that there are men here who can roll iron to within $\frac{1}{100}$ in. of the exact size.

MR. BURDICT.—Bolts are sold by the hundred usually, and many manufacturers use their iron scant. The bulk of the bolts are sold that way. If we made fits exact and offered such bolts to a purchasing agent, the next maker, who uses scant iron whose fits rattle, would come along, and we would get left on one-half per cent.

The threads of plow bolts vary very much, and as a result the plow men are paying 50 per cent. more for their work than there is any necessity for. If they did what you gentlemen are doing, they would buy their goods very much cheaper. You have hit the right course in having a maximum and minimum limit for the gauges. I never yet saw round iron. It is always more or less oval. If the manufacturers are going to figure down so that their iron will fit the gauges both ways, I want to give them an order before they leave here to-night.

MR. WILSON.—We are full for two months. [Laughter.] With steel guides we find no difficulty in making the iron round. Mr. Burdict does not order his iron from the right makers

MR. BOND (representing the Pratt & Whitney Company) exhibited and explained some samples of limit gauges for round iron which that company submitted, one of which is represented by the engraving.

The gauge consists of a round plug having two different diameters in it, one $\frac{1}{100}$ in. larger and theother $\frac{1}{100}$ in. smaller than the standard size. An external gauge, of the form represented in the engraving, is then made, one end of which fits the larger diameter, and the other the small diameter of the plug. The external gauge is the one which is used for inspecting iron. The plug is to be kept in the office or storeroom as a reference gauge to test the external gauge to ascertain when it is worn or altered in size. They are both made of hardened steel. The cost of a pair of gauges of this kind he thought would be from $3.50 to $4. The external gauge would have to be renewed from time to time after it became worn, but the plugs would not.

MR. FORNEY moved that it be declared as the sense of this meeting that there should be a difference of $\frac{1}{100}$ in. between the two gauges for iron of less than $\frac{1}{2}$ in. diameter, $\frac{1}{75}$ in. for $\frac{1}{2}$ in. iron, and $\frac{1}{50}$ in. for iron above $\frac{1}{2}$, up to and including $1\frac{1}{2}$ in. diameter. The motion was unanimously adopted, with the understanding that iron shall enter the large gauge and shall not enter the small one either way.

MR. HOWELLS was requested to explain the Harvey system of screw threads, which he did, and submitted specimens. As it has been described in Mr. Chanute's paper, Mr. Howells remarks will not be reported.

The meeting then adjourned.

THE SCRAP HEAP.

Softening Steel.

A correspondent of the *English Mechanic* gives the following method for softening steel: "Heat your steel to a dull red heat, hold it in some dark or shady nook or corner until you can just see the least possible tinge of redness, then cool immediately in water at the ordinary temperature, and you will be able to file or turn it with very little difficulty. I have tried this plan on steel from the smallest sizes up to 1 in. diameter with success; beyond that I have not gone. I do not claim that this way is better than, or as good as, some that have been given for annealing steel; but there are times when the delay of the ordinary process is extremely inconvenient—as in the filing of turning tools of a particular shape, re-annealing steel when the skin is taken off, etc.—and then this mode answers admirably."

Ventilation of the London Underground Railway.

Iron, of recent date, says: "Some definite steps are likely to be taken in the ventilation of the underground railways of the metropolis. We learn that Captain Galton, C. B., inspected, on Saturday last, the railway tunnel between the Mansion House station and Blackfriars Bridge, in order to examine the ventilation arrangements. The inspection arose out of the inquiry which has been held during the past week at the Surveyors' Institution, Westminster. The inquiry has been held by order of the Board of Trade, under Section 12 of the Metropolitan District Railway act, 1881, authorizing the company to construct ventilators in the streets and other public places within the limits of the Commissioners of Sewers and the jurisdiction of the Metropolitan Board of Works. Under the powers conferred by this act, the engineer of the railway prepared a scheme for the ventilation of the lines between Sloane Square and Mansion House stations, by means of 20 ventilators; of which four would be placed in the public gardens on the Thames Embankment, and most of the others in public roadways, so constructed as to serve the purpose of refuges. The Board of Works and City authorities strongly object to the scheme, and the former has submitted another, through their engineer, Sir Joseph Bazalgette, by which they hold that the line could be effectively ventilated by means of six shafts. In support of these two schemes a large amount of engineering and other evidence has been taken during the six days which the inquiry lasted. Captain Galton is not expected to make his award before the middle of next month. We look forward with interest to the publication of his report."

Losing Railroad Cars.

Probably a good many of our readers will coincide with the London *Engineer* in commenting on the following paragraph, and will make their wishes apply to some American roads and their rolling-stock. That paper says:

"A notice was recently credited to the Brighton Railway Co. to the effect that there were missing from their rolling-stock seven first-class carriages, two composite carriages, eight second-class carriages, two second-class brakes, eleven third-class carriages, three passengers' brakes, four passengers' luggage vans, and one horse-box. The statement has since been contradicted as absurd, which is to be regretted, for if such a loss should occur, one might wish it to take place every week for a year on the Southeastern Railway."

ANNUAL REPORTS.

Chicago, Burlington & Quincy.

The following statement for the year ending Dec. 31 is published in Boston, December earnings this year estimated:

	1882.	1881.	Inc. or Dec.	P.c.
Earnings	$21,200,000	$21,324,150	D. $124,150	0.6
Expenses	11,143,000	11,066,575	I. 76,485	0.7
Net earnings.	$10,057,000	$10.257,635	D. $200,635	1.9
Charges	4,972,324	4,428,367	I. 543,957	12.3
Surplus	$5,084,676	$5,829,268	D. $744,592	12.8

Dividends paid in 1882 were 8 per cent., amounting to $5,028,495, leaving a balance of $56,181. In 1881, after paying 8 per cent., there was a surplus of $1,479,981, of which the sum of $1,000,000 was appropiated to improvement fund.

The mileage worked increased from 2,924 to 4,100 miles during the year.

The Boston *Transcript* says: "Briefly stated, the stock and debt of the company for each year stand as follows:

	Dec., 1881	Dec., 1882.
Capital stock	$55,337.446	$69,814,191
Funded debt	59,122,725	71,082,000
Total	$114,460,171	$140,896,191

"The increase in capital account, however, represents the cost of the Denver Extension and the acquisition by purchase of the Burlington & Southwestern in Iowa. The increase of the bonded indebtedness included in the $26,000,000 is also to be partly appropriated to the taking up of $3,000,000 of the present 8 per cent. Chicago, Burlington & Quincy bonds."

Atchison, Topeka & Santa Fe.

The following statement is published for the year ending Dec. 31, December of this year partly estimated:

	1882.	1881.	Increase.	P. c.
Earnings	$14,865,354	$12,584,509	$2,280,845	18.1
Expenses	8,698,760	8,037,827	660,933	8.2
Net earnings	$6,166,594	$4,546,682	$1,619,912	35.6
Charges	1,923,930	1,798,932	124,998	6.9
Surplus	$4,242,664	$2,747,750	$1,494,994	54.4

Charges include interest, rentals and sinking funds.

The dividends actually paid in 1882 were 8 per cent., amounting to $3,324,916, and leaving a balance of $917,748 to profit and loss.

New York Central & Hudson River.

We give below some of the more important figures of this company's report for the year ending Sept. 30, 1882, which were not contained in the abstract of the report published in our issue of Dec. 22 last:

	1881-82.	Inc. or Dec.	P.c.
No. passengers	10,308,979	Inc. 1,408,730	13.7
Passenger mileage	432,243,282	Inc. 58,474,302	13.5
Average journey	41.9	.....	...
No. tons freight	11,330,393	Dec. 260,986	2.3
Ton miles	2,394,799,310	Dec. 252,014,788	9.5
Average haul	211.4	Dec. 17.0	8.0

The working expenses in detail were:

For maintaining road:	1881-82.	Inc. or Dec.	P. c.
Repairs of road-bed	$2,257,943.57	Inc. $695,511.23	40.5
Rails for repairs	417,042.48	Dec. 149,724 96	26.4
Repairs—buildings	390,416.22	Inc. 61,254.67	18.6
" fences and gates	40,609.83	Inc. 9,496.07	35.2
Taxes on real estate	973,573.27	Inc. 28,363.18	3.0
Total	$4,079,585.37	Inc. $644,900.19	18.8
Maintenance of equipment:			
Repairs—engine and tenders	$1,066,620.70	Dec. $277,132.94	20.6
Repairs—cars	2,279,434.29	Dec. 373,374.85	14.1
" tools and machinery	115.489.84	Inc. 9,476.76	9.0
Incidental (oil, waste, fuel at shops, etc.)	205,219.16	Inc. 34,171.29	20.0
Total	$3,666,763.99	Dec. $606,859.74	14.2
Operating road:			
General office	$186,303.54	Dec. $589.10	0.3
Agents and clerks	1,320,455.68	Dec. 41,304.61	3.1
Labor loading and unloading freight	1,505,844.31	Inc. 27,182.86	1.8
Porters, switchmen, flagmen, watchmen	708,241.07	Inc. 33,079.80	4.9
Fuel and water station attendance	54,652.22	Inc. 3,771.43	7.4
Conductors, baggagemen and brakemen	835,915.27	Inc. 2,586.56	0.3
Enginemen and firemen	1,348,481.26	Dec. 24,800.74	1.8
Fuel, and preparing same	2,382,755 42	Dec. 69,235.93	2.8
Oil and waste (trains)	272,888.91	Dec. 19,884.00	6.8
Loss and damage, baggage and freight	92,590.52	Inc. 32,155.01	53.2
Injuries to persons	135,711.30	Inc. 87,013.79	64.1
Damages to property (cattle, etc)	4,305.46	Dec. 2,823.66	39.6
General office expenses	80,070.77	Inc. 11,606.72	17 0
Car hire	1,466.761.00	Dec. 20.7743.46	12.5
Hauling cars in N. Y. city	57,733.64	Inc. 4,073.68	7.0
Lighterage and cartage	783,260.81	Inc. 14,270.32	1.8
Rents	176,221.50	Inc. 8,947.11	5 4
Contingencies	237,632.32	Inc. 35,040.99	17.3
Total	$11,649,625.00	Dec. $106,852.63	0.9
Total working expenses	19,395,974.36	Dec. 68,812.18	0.4

The expenses under the three principal heads, and the amounts allotted to freight and to passenger transportation for three years have been:

	1879-80.	1880-81.	1881-82.
Maintenance of road	$3,134,486.10	$3,434,685.18	$4,079,585.37
Maintenance of equipment	3,611,825.32	4,273,623.73	3,666,763 99
Operating road	11,103,582.96	11,576,447.63	11,649,625.00
Total	$17,849,894.38	$19,464,786.54	$19,395 974.36
Freight expenses	13,670,884.15	14,913,213.93	14,387,380.78
Passenger exp	4,179,010.23	4,551,572,61	5,008,593.58
Total	$17,849,894.38	$19.464,786.54	$19,396,974.36

New Haven & Northampton.

This company owns a line from New Haven, Conn., to Conway Junction, Mass., 94 64 miles, and from the latter point runs trains over the Troy & Greenfield road to North Adams, 28 miles. It is also owner of branch lines from Farmington to New Hartford, Conn., 14 miles; from Northampton to Williamsburg, 7.50 miles; from South Deerfield to Turner's Falls, 10 miles, and leases the Holyoke & Westfield road, running from Holyoke to Westfield, Mass., 14 miles. The total length of road operated is 169 miles, of which 137 are owned.

The equipment consists of 28 locomotives; 28 passenger train cars; 479 freight and 79 service cars.

The general account, condensed, is as follows:

Stock		$2,460,000.00
Bonds		3,200,000.00
Bills payable, etc		585,000.00
Accounts and balances, October coupons		90,629 22
Income and expenditures accounts		379,339.00
Total		$6,714,968.22
Road and equipment	$6,462,351.09	
Stocks, bonds and real estate	97,372.81	
Sinking fund trustees	52,500 00	
Materials	82,879.33	
Cash and balances	19,864.99	
		$6,714,968.22

Two locomotives, two passenger, 10 box and two dump-cars were added to the rolling stock during the year. There were expended on the Northern Extension during the year $99,516.30, making the total cost to Sept. 30, 1882, $1,385,743.40. The business of this part of the road shows a considerable increase, and it is believed will soon produce satisfactory net earnings.

The bonded debt consists of $1,300,000 first-mortgage 7 per cent. bonds; $1,200,000 consolidated 6 per cent. bonds, and $700,000 5 per cent. extension bonds. During the year $190,000 convertible 6 per cent. bonds became due and were paid off. The annual interest charge is $190,000 as against $200 400 last year.

The earnings for the year were as follows:

	1881-82.	1880-81.	Inc. or Dec.	P. c.
Freight trains	$651,864	$547,747	I. $104.115	19.0
Passenger trains	225 442	181.5 5	I. 43,927	24.1
Wharfage, rents, etc	18,965	'22,351	D. 3,387	15.2
Total	$896.271	$751,614	I. $144.647	19.3
Expenses	562,784	453,477	I. 109,307	24.1
Net earnings	$333,487	$298,137	I. $35,350	11.9
Gross earn. per mile	5,272	5,082	I. 190	3.7
Net " "	1,962	2,014	D. 53	2.6
Per cent. of expenses	62.79	60.33	I. 2.46	....

The length of road operated during the year was 169 miles, as against 148 in 1880-81, the Northern Extension not having been opened until late in that year.

The following is a condensed statement of the receipts and expenditures:

Net earnings as above		$333,486.37
Increase bills and coupons		269,200.00
Cash and accounts last report		102,196.13
Interest and dividends		4,200.00
Balance cash account		27,625.22
Total		$736,707.72
Interest on bonds	$203,695.33	
" floating debt	34,931.88	
" H. & W. bonds	17,600.00	
Rental H. & W. R R	10,815.95	
Taxes	28,926.33	
Construction and equipment	197,152.29	
Sinking fund	15.000 00	
Accounts and balances due	19,864.97	
Old balance charged off	478.44	
Increase of materials	363.48	
Purchase of real estate, etc	17,881.03	
Bonds of 1882 paid and endorsed	190,000.00	
		736,707.72

The traffic for the year was as follows:

	1881-82.	1880-81.	Inc. or Dec.	P.c.
Train-miles	683,322	484,774	I. 198,548	41.0
Passenger carried	483,229	356,776	I. 126,453	35.4
Passenger-miles	8,726,851	5,612,006	I. 3,114,845	55.5
Tons freight carried	498,671	448,450	I. 50,221	11.2
Ton-miles	24,800,865	18,705,765	I. 6,095,100	32.6
Average receipts:				
Per pass.-mile	2.30 cts.	2.53 cts.	D. 0.23 ct.	9.1
Per ton-mile	2.63 cts.	3.00 cts.	D. 0.33 ct.	11.0

During the year 10,400 feet of new side tracks were built at various points on the road, and several other important improvements made. Notwithstanding the large increase in train mileage and in passenger and freight movement there was no serious accident or damage on the railway.

Hartford & Connecticut Western.

This company owns a line from Hartford, Conn., to the New York state line, 66.7 miles, and uses the Newburg, Dutchess & Connecticut Railroad from the state line to Millerton, N. Y., 1.7 miles, making the total length of line operated 68.3 miles. The present is the first report of the existing company, and is for 14 months ending Sept. 30, 1882. The equipment consists of 15 locomotives, 21 passenger and baggage cars and 429 freight and other cars.

The general account is as follows:

Stock		$2,165,000 00
First-mortgage bonds		140,000.00
Bills and accounts		101.711.98
Convertible bonds		555,000.00
Profit and loss		19,868.75
Total		$2,981,580.73
Road and equipment	$2,771,904.00	
Real estate	93,129.81	
Materials	82,392.23	
Due from agents	29,589.95	
Cash	4,566.74	
		2,981,580.73

The earnings for the 14 months were as follows:

Passengers	$133,304.19
Freight	222,093.57
Mails, express, etc	13,498.88
Total ($5,424.95 per mile)	$368,896.64
Expenses (93.9 per cent.)	346,393.34
Net earnings ($330.94 per mile)	$22,503.30

The following is a statement of the receipts and expenditures:

Materials, cash and accounts from Trustee		$33,122.12
Gross earnings		368,896.64
Sale of first-mortgage bonds		140,000.00
Bills and accounts payable		101.711.98
Total		$643,730.74
Accounts payable from Trustee	$19,096.70	
Operating expenses	346,393.34	
Taxes	9,038.98	
Interest	7,020.90	
Equipment	51,904.00	
Real estate	93,129.81	
Materials	82,390.23	
Accounts receivable	29,589.95	
		639,164.00
Cash to balance		$4,566.74

No statement of traffic is given in the report. President Gilbert's report says: "The property was surrendered by the bondholders to the Trustee, on April 28, 1880, who continued in the management of it until Aug. 1, 1881. Your directors found that during that time the income of the property had been economically handled and invested, and that marked improvements had been made in all that pertains to permanent way, and tends to reduce the cost of repairs, etc.; 1,043 tons of steel rails had been laid, trestle bridges had been filled with earth, new bridges of timber and iron, and several important pieces of masonry had been constructed, a new station had been built at Simsbury, and the business facilities about other stations had been improved. Evidently more than $100,000 in betterments had been added to the property, and of a nature outside of expenditures usually included in cost of repairs and renewals. The small amount of indebtedness which was transferred by the Trustee was also noticeable, and in no way calculated to embarrass the new company.

"Your directors, appreciating that the best interests of the property were such as to demand still further renewals and expenditures, in order to increase its earnings by reason of increased facilities, and to reduce by reason of the same improvements the comparative cost of operation and maintenance, have issued bonds as was provided in the act of this company's incorporation, for the purpose as therein stated of completing and equipping the same. Of these $140,000 have been disposed of to date. These bonds which are to run from five to 20 years, at the option of the company, were placed at 5 per cent. The company has purchased in Hartford the real estate which was formerly rented for freight and other terminal facilities, and paid for it $93,000. Its title to other real estate, encumbered, has also been perfected. The purchase of the Rhinebeck & Connecticut Railroad was made, and the transfer of that property perfected on July 1, 1882. The terms of the purchase, as by the authority of meeting of May 25, 1882, were $800,000 of the stock of this company."

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subject pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE NEW YORK CENTRAL REPORT.

Two weeks ago we published the summary of the report of the New York Central & Hudson River Railroad for year ending Sept. 30 last, as it was given to the press, without any analysis, as it was received too late to be read even before printing. We have since obtained more details, as contained in the report to the State Engineer and Surveyor, chiefly concerning the items of expenses, and we now purpose to examine the report and compare the results with those of previous years.

The passenger traffic of this road, as of most others, has not shown constant growth, but has often declined, and in spite of the general growth of business after 1877, it was smaller in 1880 than in any of the five years previous to 1877. In 1880-81, however, it was larger than ever before, and under the stimulus of the extremely low through rates of last year and the heavy immigration, it increased again no less than 13½ per cent., making it 48 per cent. larger than in 1878-79 (when it was smaller than ever before, however.)

The growth of freight traffic, however, as on the other trunk lines (except the Erie, previous to 1878) has been almost uninterrupted. There was a trifling decrease (3¼ per cent.) from 1876 to 1877, but none again till last year, when the decrease from 1881 was no less than 9½ per cent. If we count a passenger mile as equivalent to two ton miles then the total traffic of 1881–82 was about 4 per cent. less than that of the year before.

The course of traffic on this road for the last 14 years may be traced in the following table, in which the figures are for the number of *millions* of passenger and ton miles:

Year.	Pass. miles.	Ton miles.	Year.	Pass. miles.	Ton miles.
1868-69	344.1	606.5	1875-76	353.1	1,674.4
1869-70	346.9	788.7	1876-77	316.8	1,620.0
1870-71	313.2	905.9	1877-78	300.3	2,042.8
1871-72	342.3	1,042.0	1878-79	291.0	2,295.8
1872-73	364.4	1,277.5	1879-80	330.8	2,525.1
1873-74	350.8	1,391.6	1880-81	373.8	2,646.8
1874-75	338.9	1,404.0	1881-82	432.2	2,394.8

Last year the freight traffic was not only less than in 1880-81, but less also than in 1879-80. This, however, was what was to have been expected. This road is the chief carrier of Western produce to the East and the seaboard, and of general merchandise from the East to the West. Anything which affects these two great currents of traffic affects it more than any other road. Now the east-bound traffic of last year was chiefly determined by the crops of 1881, which were much smaller than that of the two previous years. All the roads suffered from this; the New York Central almost, because it has most of it.

The merchandise movement westward in this year was probably larger than ever before, but this is usually little more than a fourth part of the east-bound movement in bulk. The company reports a decrease of 532,681 tons (26 per cent.) in its through east-bound freight, and an increase of 146,303 tons (38½ per cent.) in the through west-bound, so that the balance shows a large decrease. These figures, however, include only the movement between New York and Buffalo or Suspension Bridge, which is probably not half of the traffic we speak of and which was affected by the crops and the demand for merchandise.

The year was a time of activity in almost all manufacturing industries, of which there is a vast number which are served by the New York Central. There was, however, much less *increase* in the products of the textile and other industries which it serves, whose products are generally valuable in proportion to their bulk, and form a high-class freight, than in the coal and iron industries, which are so distant from its line that it gains comparatively little by their prosperity. These industries, when active, supply an enormous traffic, and, as we have pointed out before, all the trunk lines except the New York Central profit greatly by them; and they more than anything else—perhaps they alone—saved the other trunk lines from losses last year like those of the New York Central. For the Erie we have evidence of this in its late report. In freight, other than coal, it showed a decrease of 4 per cent. in traffic and of 12.8 per cent. in earnings, against the New York Central's decrease of 9½ per cent. in all freight traffic and 15 per cent. in freight earnings, and the Central had a *decrease* in its coal traffic, which was 2,388,976 tons, against the Erie's 6,104,672. The Pennsylvania gained more from coal and iron than the Erie probably, and the Baltimore & Ohio gained greatly by them also.

Thus it was to be expected that the New York Central freight traffic should suffer more last year than that of the other roads. It had more of the kind of traffic which grew smaller, and much less of the kind which grew larger during the year. When we come to examine the earnings we will find that this applies with double force to them.

There has been widely spread among Eastern investors a feeling that nothing could hurt the New York Central, or at least that anything that hurts it will hurt its rivals still more. This is a pure delusion, however. The New York Central is vulnerable like other railroads, though the circumstances which make it weak do not occur, at least have not heretofore occurred, so often as those from which its rivals suffer most. When the iron industry was prostrate, and the coal production light, then the other trunk lines, and the Pennsylvania especially, suffered greatly from causes which affected the New York Central but little; as we see above by the record of its ton-mileage, its freight business went on increasing almost without interruption, while for some years that of the Erie stood still, and the Pennsylvania's grew slowly. The New York Central's grew from 1,278 millions in 1873, to 2,043 in 1878; the Pennsylvania's (Main Line and Branches, with about the same mileage) from 1,385 millions to 1,732 in the same time—a time of growth in agricultural traffic, but of slow progress in coal and iron production. The Central's gain then was 765 millions of ton-miles, the Pennsylvania's 347 millions; but from 1878 to 1881 the Pennsylvania gained no less than 923 millions; the New York Central only 604. We have not the Pennsylvania's traffic for 1882 yet, but it will probably show a large increase over 1881 (judging by the earnings), notwithstanding a large decrease in agricultural freight, while the Central suffered a decrease.

Thus while in seasons like those succeeding 1873 the New York Central may be in an exceptionally strong position, commanding the larger share of the traffic that grows larger, and but little of that which grows smaller, in seasons like those since 1878 it is really in an exceptionally weak position, and especially suffers much more than any other trunk line by war rates on through freight. Due appreciation of this fact very likely would have saved us from the trunk line war of 1881, from which certainly the New York Central suffered more than any other road, as might have been known beforehand if the condition of the different branches of industry in the country had been appreciated. It must be said, however, that but for the bad crops of 1881 the results would have been less disastrous to all, and especially less disastrous to the New York Central, as with good crops they might have secured fair profits from produce east-bound in the first half of 1882, after the war closed.

The indications are now that the growth of traffic hereafter for a time from manufacturing and mining industries will be less than for a few years past, and if agricultural traffic grows, as it is likely to do under such circumstances, the position of the New York Central in relation to the other trunk lines is likely to become stronger than of late, unless a large share of its through traffic is diverted by new lines between New York and Buffalo.

The passenger, freight and total gross earnings, and the net earnings of the road for eleven years have been:

	Earnings.			
Year.	Passenger.	Freight	Total.	Net.
1871-72	$7,772,202	$17,573,738	$28,4[illegible]7,301	$10,271,381
1872-73	8,147,672	20,947,168	32,496,621	12,925,574
1873-74	7,497,357	20,348,725	31,650,87[illegible]	13,262,089
1874-75	7,270,848	17,869,791	29,027,218	11,765,110
1875-76	6,762,967	17,593,265	28,046,588	11,922,416
1876-77	6,576,816	16,424,317	26,579,686	11,632,924
1877-78	6,022,955	19,045,840	28,910,755	12,774,678
1878-79	5,953,102	18,270,250	28,396,584	12,[illegible]73,511
1879-80	6,611,159	22,199,766	33,175,913	15,326,019
1880-81	6,958,038	20,736,750	32,348,367	12,[illegible]83,610
1881-82	7,816,519	17,672,252	30,628,781	11,232,807

The passenger earnings, we see, were 12½ per cent. more last year than the year before, and more than in any other year, except 1872–73. The freight earnings, however, were not only 15 per cent. less than in 1881 and 20½ per cent. less than in 1880, but they were smaller than in any other year of the eleven except 1876 and 1877—both years of railroad war also, and the latter a year of bad harvests and general prostration of industry. The Central's freight traffic was nearly 50 per cent. more in 1882 than in 1877, its freight earnings only 7½ per cent. more.

The total earnings of the road were less than in either of the two previous years, but were larger than in any year between 1874 and 1880.

The net earnings, however, *were the smallest since* 1872, notwithstanding, or rather because, the traffic has been exceeded only in two years. Carrying a very large share of its traffic at less than cost, as it did for most of the year, the fact that it was large was a positive disadvantage. But for its enormous local traffic and travel, most of which remained profitable, the profits of the year must have been very much less than they were. It is questionable whether this local traffic produced as much profit as the year before, as the rates on part of it were affected by the war, so that we may assume that as much as the whole of the decrease of $1,650,000 in net earnings was due to the low through rates and the decrease in east-bound through freight.

The course of through freight can be partly traced by the statement given of the movement between New York and Buffalo or Suspension Bridge. This excludes the New England traffic between Albany and Buffalo, which in 1880 was about equal in amount to the New York tonnage. The figures are:

	1879-80.	1880-81.	1881-82.
Tons east and south	1,690,880	2,056,588	1,523,907
" north and west	347,251	436,497	582,800
Total	2,038,131	2,493,085	2,106,707
Ton-miles	807,800,000	1,090,000,000	827,000,000

In 1880, the through traffic between Albany and Buffalo afforded a tonnage mileage just about 70 per cent. of the New York-Buffalo tonnage mileage. If this proportion has continued since, then the local traffic has not increased; but it must have increased from 1880 to 1881 at least, which leads to the conclusion that the New York Central's New England traffic has decreased. The decrease in the New York-Buffalo through freight last year was of itself equivalent to 163 millions of ton miles, while the total decrease was 252 millions; this and more than this may reasonably be supposed to have been due to a decrease in the through traffic to New England, Philadelphia and Baltimore.

We give, under the head of "Annual Reports," a few figures not contained in the summary of the report which we published two weeks ago, including the passenger and ton mileage, and the items of operating expenses, the last of which will be examined with the more care, because it was a year of bad earnings in which there is sometimes an effort to increase net earnings by postponing expenditures for maintenance and renewals.

A critical examination of the details of expenses shows that the expense of maintaining the road was extraordinarily large last year—18¾ per cent. more than in 1881, and no less than 30 per cent. more than in 1880. Those who look upon the cost of rails as a chief element in determining this expenditure should note that this item was little more than *one-tenth* of the New York Central's expenses for maintaining road last year. In that year the expenditure for rails was, indeed, about $150,000 less than in 1881, but it was about the same as in 1880. There were but 6,600 tons of rails used for repairs last year, against 9,014 the year before. These renewals, however, are always very light for some years after tracks have been laid with steel.

The renewals last year were equivalent to 64.7 miles

of track out of the 2,657 miles which the company has—less than 2½ per cent. At that rate, the rails would be renewed once in 40 years, which is a much longer life than can be hoped for.

The great increase in maintenance of road expenses was in repairs of road bed.

The increase above was nearly balanced by a decrease of $606,860 (14¼ per cent.) in the cost of maintaining equipment. But the cost was still as low as in 1880 (a little lower). The cost of maintaining motive power was 20½ per cent. less in 1882 than in 1881, and of maintaining cars 14 per cent. less.

With a road thoroughly stocked as this was before 1882, an unusual proportion of the equipment being new, the cost of maintenance is likely to be below the average, especially if the traffic is not growing. The other trunk lines were in similar condition, some with a much larger proportion of new equipment.

The transportation expenses, or "cost of operating road," cannot be put off and made large in seasons of great profits and small when profits are small, as is to a great extent possible with maintenance expenses. We find that, with passenger traffic 13½ per cent. larger and freight traffic 9½ per cent. smaller, the transportation expenses were not quite 1 per cent. less.

The train mileage was considerably smaller in 1882; and cost per *train-mile* for maintenance and transportation for three years has been, in cents:

	1879-80.	1880-81.	1881-82.
Maintenance of road	18.80	19.74	24.03
Maintenance of equipment	21.69	24.55	22.41
Operation	66 67	66.55	71 20
Total	106.16	110.84	118.54

The cost per train-mile thus *increased* last year, and was then 7 per cent. more than in 1881 and 11¾ per cent. more than in 1880.

The cost per freight train-mile includes the total sum paid for car-hire, without any credit for the amount received for car-hire. In comparing the results of different years on this road, this makes little difference, but in comparisons with other roads, all, or nearly all, of which charge to expenses only the excess of expenditures over receipts for car-hire, it unduly exaggerates the expense on the New York Central. Last year $1,466,761 was paid for car-hire, equal to 13.5 cents per freight train-mile; but the excess of payments over the receipts for car hire was only $399,646.59, which is 3.66 cents per freight train-mile. If in this respect the expenses were charged like those of other roads, the expense per freight train-mile would be but $1.21 in 1882, instead of $1.31.

The average receipt, expense and profit per unit of traffic for the last seven years have been:

	Per ton-mile.			Per pass.-mile		
	Receipt.	Cost.	Profit.	Receipt.	Expense.	Profit.
1875 76	1.05	0.71	0.34	1.91	1.09	0.82
1876-77	1 01	0.70	0.31	2.07	1.14	0.93
1877-78	0.914	0.590	0.324	2.01	1.28	0.73
1878-79	0.796	0.541	0 255	2.05	1.19	0.86
1879-80	0.879	0.641	0.338	1 998	1.266	0.732
1880-81	0.783	0.563	0.220	1.862	1.218	0.644
1881-82	0.738	0.600	0.138	1.808	1.159	0.649

Thus last year the receipt per ton per mile was 6 per cent. less than in 1881, but the cost was nearly 7 per cent. greater, in consequence of which the profit per ton per mile fell 37 per cent., to 0.138 cent.—much the smallest profit ever made on any important road, we imagine. The cost per ton per mile is the largest reported since 1877. It should be remembered that a difference of a hundredth of a cent in the average cost or rate per ton per mile made a difference of $24,000 in the profits. While the report for 1881-82 shows a decrease of $3,064,498 in gross freight earnings, it shows a decrease of but $525,833 in freight expenses, so that the profits from freight were:

	1879-80.	1880-81.	1881-82.
Freight profits	$8,529,082	$5,823,536	$3,284,871

Thus last year the freight profits were 43½ per cent. less than in 1881 and no less than $5,244,211, or 61½ per cent. less than in 1880! This last by itself is nearly enough to pay 6 per cent. on the stock. The decrease may be partly due to a change in the method of dividing expenses between passengers and freight, but there has been a decrease of $4,093,211 in the total net earnings in the two years, and the whole of this, if not more, was doubtless in the profits of the freight traffic.

Of the decrease in freight profits since 1881, amounting to $2,538,665, about $554,600 was due to a decrease in traffic, $1,088,000 to lower rates, and $896,000 to higher expenses. With 5 per cent. less freight traffic than in 1879-80, the freight expenses were larger by $716,496, or 5½ per cent., though there was a decrease of 655,000, or 5⅞ per cent. in freight train mileage.

There can be no doubt that since the close of this company's fiscal year its traffic has not only improved, but has become unusually large and profitable. A note appended to the report says that the gross earnings for the quarter ending with December would be about $1,200,000 more than in 1881—an average increase of $400,000 a month. Just at present the business is probably as good as at almost any time in the history of the road, and there seems everything to make a heavy winter traffic at profitable rates; though on east-bound freight the rate is low, it is still profitable; some traffic will be diverted from this and the other trunk lines by the new road just opened to Buffalo, and some passenger traffic by the West Shore road from New York to Albany, which will be opened so far before long, but there is now a fair prospect that the New York Central will make considerably more than in 1881, when the profit was $8.82 per share, and possibly as much as in 1880, when the profit was $11.82. The traffic of the current fiscal year will not be much affected by the next harvest, but it may be considerably by a change in manufacturing industries and the demand for merchandise. The harvest will have much to do with the results of the next fiscal year, and perhaps, before its close, the opening of the West Shore road to Buffalo.

THE IMPROVEMENT OF LOCOMOTIVES.

It is not entirely unprofitable at times to speculate about what we would do if we had entire freedom and absolute power to act as we choose. Probably, if that condition of things existed, and we were to exercise the liberty of doing what we like, to use a common phrase, we would often "make a mess of it." Still, castles in the air are not expensive, so long as they remain in the atmosphere; it is only when they touch the earth that they become costly. Scheming about mechanical and engineering subjects, like other day-dreams, does not absorb much money, although it often wastes a great deal of time. It is only when such ideas assume an experimental form that such entertainment must be paid for in hard cash. Therefore, as this kind of speculation is cheap, we will venture to indulge in it to the extent of indicating what might be done in the way of improving locomotives if, as has been said, entire freedom, unlimited time and unrestricted means were, as the Spaniards say, at our disposition, to speculate and experiment with locomotives at will.

As a preliminary explanation, it will be said that whatever increases the capacity without adding to the cost of locomotives, or lessens the cost without diminishing the work done, will be regarded as improvement. Besides, whatever adds to the safety or comfort of either the operatives or travelers on railroads will also be regarded as improvement.

Proceeding then by a scientific method of differentiation, it may be said, first, that the amount of work which a locomotive can do depends primarily upon its steam-generating capacity. On the other hand, the energy which it can *exert* depends upon the adhesion of the driving-wheels to the rails, and on the mechanism by which the steam pressure is exerted so as to cause the wheels to revolve.

At first sight it might appear that these two elements or functions might be considered quite independently of each other, but a little consideration will show that they are correlated one with the other. Thus, let us take the ordinary type of American engine, with one driving-axle in front and another behind the fire-box, and with a four-wheeled truck in front. With such an arrangement of parts the weight of only one end of the engine can rest on the driving-wheels, and the fire-box cannot be wider than the distance between the wheels, nor longer than that between the driving-axles, unless it is placed above and extends beyond either the axles or wheels or both, but in that event the fire-box will be diminished in depth or the boiler must be proportionally elevated.

If, however, all the driving-axles are located in front of the fire-box, then not only the back end, but the front end also, of the engine may rest on the driving-wheels, and it will be possible to make the fire-box behind the wheels of any desired width. Therefore we arrive at the general principle, that to increase the adhesion and the size and capacity of the fire-box of the American type of locomotives without incurring the objections referred to, the driving-axles should all be in front of it. The same thing is true of ten-wheeled, mogul and consolidation engines.

If the driving-axles are all placed between the cylinders and fire-box, then the weight of the last two will overhang the former. If the axles are spread far enough to get a considerable length of wheel-base, it will then be necessary, with the ordinary methods of construction, to lengthen the boiler and tubes to an extent which, if the whole weight of the engine is supported on the driving-wheels, would make that weight exceed the limits of ordinary practice. With such an arrangement, therefore, it becomes necessary in order to get the requisite length of wheel-base and to carry the overhanging weight to place one or more pairs of wheels under the front end of the engine, and, if the cylinders are close up to the front pair of driving-wheels—as they must be unless the driving-axles are placed very close together, in order to avoid having an excessively long boiler—then the additional wheels in front must be placed ahead of the cylinders.

With such an arrangement, especially if the fire-box is widened as has been suggested, and if the foot-board and cab are placed behind the fire-box, there will be a very great overhanging weight at the back end of the engine, so great as to overload the hind pair of driving-wheels.

The remedy for this difficulty which naturally suggests itself is the addition of one or more pairs of wheels under the back end of the engine to carry the overhang there, in a similar way to that in which the wheels were arranged at the front end for the same urpose.

But there are some difficulties in the way of adopting this expedient at the back end if the fire-box is made wider than the distance over the driving-wheels. If this is the case, and inside frames and journals are used for the driving-axles, then it will be impossible to extend the frames backward beyond the front of the fire-box, unless the latter is placed on top of the frames. This would diminish its depth, and it would also be objectionable to have the frames under the grates, as they must be if the fire-box is wider than the transverse distance over the driving-wheels. Even if no trailing wheels are placed under the back end of the engine, it will be essential to devise some means by which its tractive power may be transmitted from the driving-wheel frames to the tender and train behind.

The first expedient which suggests itself for this purpose is to place the frames and journals of the driving-axles outside of the wheels, as was formerly done on some American engines and is now practiced in Europe. There are, however, grave objections to this, especially with outside cylinders, because the latter must then be spread a good deal further apart with outside than with inside cylinders. Besides this evil, the axles must all have independent cranks, which the American mechanical mind abhors and with good reason.

The question then comes up, how can the inside frames be retained, and yet, in the transmission of the tractive power backward, accomplish what apparently outside frames alone can do. The solution of this problem suggests itself by the simple expedient of using inside frames for the driving-axles, and outside frames to transmit the tractive power to the tender and train. To do this the frames for the driving-axles must abut against the front of the fire-box, and the other frames would be placed outside of the fire-box, wheels and crank-pins, and could be carried forward and attached to the cylinders, with a cross brace or distance piece between the wheels, which might be fasned to the inside frames. The outside frames would also extend backward and support the foot-board and cab.

With such an arrangement, the fire box could be made of any desired width, and its depth need not be any less than that of ordinary locomotives, and there would be no necessity for elevating the boiler. The overhanging weight behind would, however, be very great, and it would be essential that some means should be provided for supporting it. This could be done by placing one or two pairs of trailing wheels behind the fire-box, arranged so that the back end of the outside frames would rest on these wheels. This plan, however, is open to the objection that it adds one or two extra pairs of wheels, with their boxes, pedestals and truck-frames, if they are arranged as a truck, as they should be. There are other objections to their use which will be considered presently.

Before doing so we should say, what every railroad engineer knows, that there is a limit to the amount of load which should be carried on a single wheel, with rails of a given weight. That this load is often reached and sometimes exceeded in our present practice is certain. It is also well known that the maximum amount of adhesion is only needed in starting trains and on heavy grades, and that with adequate boiler capacity, if the load on the driving-wheels could be increased at such times and places, the capacity of the engine would also be increased in the same proportion. It is therefore not remarkable that the idea of making the load on the driving-wheels variable has often suggested itself and has been put into practice. As much as forty years ago a patent was taken out for a method of transferring part of the weight of the tender to the driving-wheels. Numerous patents have been taken out since for the application of the same idea in various ways, and at the present time Waterman's method, which was illustrated in the *Railroad Gazette* of Sept. 1, of this year

of doing this is in use on a number of engines on the Boston & Albany Railroad, and is said to be working very successfully. It is applied to locomotives of the American type, only, one end of which, as stated before, is supported by the driving-wheels. If the whole weight of such locomotives could be thrown on the driving-wheels, there would be no need of transfering part of that of the tender to them. The arrangement and location of the wheels and axles will not permit this, and therefore part of the weight of the tender is, as it were, borrowed for the purpose of increasing the adhesion.

Now, if instead of having the driving-axles located near one end of a locomotive, as they are in those of the American type, they were placed under or near the middle of the machine, it is evident, that if there was no other support under either end the driving-wheels would carry the whole weight. It is also apparent that if there is a support at each end, and one or both of them is removed or relieved; the weight on the driving-wheels would be increased.

Now supposing that a pair of trailing wheels was placed behind the fire-box and under the foot-board, and that an arrangement was provided so that the springs which support the back end of the locomotive and which rest on the trailing-wheels could be compressed in such a way that their tension would no longer, or only partly, support the engine, thus, evidently, the weight on the driving-wheels would be increased.

There is, however, an objection to doing this, from the fact that if a considerable amount of weight is taken off of the trailing wheels, it would leave them without sufficient load to keep them securely on the rails. The objection to the use of one or more extra pairs of wheels has already been referred to.

The question then comes up, how can these two difficulties be obviated. As we don't want to add any extra wheels, the above query suggests the idea of carrying the overhanging weight of the back end of the engine on the front tender wheels. An ordinary tender carrying 2,400 gallons of water, and four tons of coal weighs, loaded, about 56,000 lbs. This on eight wheels gives a load of about 7,000 lbs. per wheel, which is considerably less than is now carried on many cast-iron wheels, and is very much below what can safely be put on steel-tired wheels. We might, for example, locate the back truck under the tender, so that it would carry 40,000 lbs. of the weight. This would then leave only 16,000 lbs. on the front truck. If then we should move it forward far enough to come under the foot-board and the back end of the outside frame of the engine, and extend the tender frame forward so that its front end, and at the same time the back end of the engine, would both rest on the front tender truck, then, evidently, the latter could carry 16,000 lbs. of the weight of the tender and 14,000 lbs. of that of the engine and still not have any more load on it than the back tender truck carries. Both the engine and the tender could be pivoted to the centre pin of the front truck and also have lateral motion on it independently of each other. Arranged in this way and with suitable appliances to relieve the springs which support the back end of the engine, the portion of its weight which rests on the front tender truck could be transmitted to the driving-wheels and still leave the truck with a load of 16,000 lbs. to keep it on the track.

This arrangement would have the following advantages:

1. It would give a fire-box of any desired width, not exceeding that of the widest cars, without diminishing its depth or elevating the boiler unduly.

2. The weight of the engine would, as it were, be balanced over the driving-axles so that any part or all of it could be carried on them if desirable.

3. The number of wheels under the engine and tender would not be greater than with the present arrangement.

4. That part of the weight of the engine, or any portion of it, which would be carried on the front tender truck, could be transferred at will to the driving-wheels without diminishing to a dangerous degree the load on that truck.

With these statements we will leave the subject for the present.

NOVEMBER EARNINGS.

Railroad earnings in November are given in our table for 74 different roads—a larger number than ever before. These roads had last November nearly half the mileage in operation in the country—54,816 miles, which is 9.8 per cent. more than they worked in November, 1881. Their earnings from this mileage were $34,596,013, which is $4,532,343 (15 per cent.) more than in 1881, and their average earnings per mile of road increased from $602 to $631, or 4.8 per cent. The comparison is not with a very unfavorable month, as might be supposed; for the 58 railroads reporting for 1881 showed a decrease in earnings per mile of but $8, or 1.3 per cent., compared with 1880, which was an exceptionally favorable year.

Of the 74 roads reporting, only nine show any decrease in total earnings, and only 12 a decrease in earnings per mile eight roads show an increase of more than 25 per cent. in earnings per mile, and six more an increase of more than 20 per cent. The largest increases were:

63.6	per cent.	by the St. Paul & Duluth.
46.8	"	" St. Paul, Minn. & Manitoba.
38.4	"	" Little Rock & Fort Smith.
27.4	"	" Hannibal & St. Joseph.
26.5	"	" Alt. & Terre Haute Main Line.
26.3	"	" Little Rock, Miss. River & Texas.
26.2	"	" Ohio Central.
25.4	"	" Alabama Great Southern.

The largest decreases in earnings per mile were:

30.2	by the	Des Moines & Ft. Dodge.
18.6	"	Denver & Rio Grande.
14.6	"	Central Pacific.
10.9	"	Chicago & Northwestern.

Of the latter all have a large increase in mileage; but all but the Chicago & Northwestern have some decrease in total earnings in spite of the larger mileage.

The roads with the largest and smallest earnings per mile in November were as follows:

Largest.	Per mile.	*Smallest.*	Per mile.
Pennsylvania	$2,209	Toledo, Cin. & St. L.	$154
Northern Central	1,616	Wis. Central	170
Iron Mountain	1,042	Green Bay, W. & St. P.	262
Marquette, H. & Ont.	937	Peoria, Dec. & Ev.	211
Eastern	936	Houston, E. & W. Tex.	244
Chicago & Alton	883	St. Louis & Cairo	248
Manitoba	872	Mil., Lake Shore & W.	257
Hannibal & St. Jo.	853	Little Rock, M. R. & Tex.	260
Hocking Valley	813	Ohio Southern	265
Missouri Pacific	797	Des Moines & Ft. Dodge.	296

No other roads in the list earned so much as $800 or so little as $300 per mile in November last. We exclude from the list the New York Elevated roads. The earnings per mile of one of these was more than eight times as great as the Pennsylvania's even. The 14 miles of the New York Elevated earned as much as 828 miles of the East Tennessee, and seven times as much as the 220 miles of the Green Bay, Winona & St. Paul.

There are reports from but five Eastern roads—the Eastern, the New York & New England, the Long Island, the Pennsylvania and the Northern Central—with 3,024 miles of road this year, and 3½ per cent. more than last year. They show an increase of 12⅞ per cent. in earnings. Their average earnings per mile were $1,856, against $1,703 the year before, an increase of 9 per cent. There are 14 roads reporting whose lines are west of Pennsylvania, north of the Ohio, and east of Lake Michigan, and all but parts of two of them east of Illinois. They had 4,966 miles of road and 10 per cent. more than last year. All had an increase in earnings, and their aggregate increase was 18½ per cent. Their average earnings per mile increased from $410 to $440, or 7 per cent. Scarcely one of the more important roads in this district report—roads like the Michigan Central, the Lake Shore, the Fort Wayne and the Pan-handle, which would bring up the earnings per mile largely.

There are 23 roads west of Indiana and Lake Michigan, in Illinois and north and east of the Missouri River, except the part of the Northern Pacific that is west of the Missouri. These roads had 20,369 miles of road in 1882 and 11 per cent. more than in 1881. Their aggregate earnings were $10,802,234, and 21⅛ per cent. more than in 1881, and their average earnings per mile increased from $484 to $533, or 10 per cent. Some of the most important roads in this district are not in the table, as the Chicago, Burlington & Quincy and the Rock Island. The reporting roads, however, show with a large increase in mileage a large increase in earnings per mile.

South of the above, which we may call the "Northwestern system," we come to the "Southwestern system," including the railroads south of the Missouri but very little north of it, far enough west to include the Kansas City, Fort Scott & Gulf and the Kansas lines of the Missouri Pacific, the Central Branch, and the St. Louis & San Francisco, but not the Atchison, Topeka & Santa Fe and the Union Pacific, and south to the Gulf, taking in all the Arkansas and Texas railroads that report. The Texas and Arkansas railroads should be given separately, as distinctively Southern roads, but that several of them are worked in connection with Missouri roads. This Southwestern system, then, had 8,122 miles of road last November and 22½ per cent. more than in 1881. With this increase in mileage there was an increase of 34½ per cent. in earnings, and the average earnings per mile increased from $534 to $587, or 10 per cent.

Further west we have the system, if so it may be called, between the Missouri River and the Pacific, numbering but five roads, but having 10,192 miles—the Union Pacific, the Central Pacific (including the Southern Pacific), the Atchison, the Denver, and the Utah Central. They increased their mileage 7½ per cent. within the year, but their earnings only 1 per cent., and their average earnings per mile *decreased* from $720 to $667.

We now come to the Southern roads south of the Potomac and the Ohio and east of the Mississippi. Thirteen of these report, with 7,609 miles of road, which is but 1½ per cent. more than last year. They earned in the aggregate 10½ per cent. more than the year before, and their average earnings per mile increased from $489 to $532, or 9 per cent.

It would seem then that in all parts of the country except between the Missouri and the Pacific earnings were materially better last November than in the corresponding month of 1881, and the improvement was unusually even, the increase in earnings per mile being 9 per cent. east of Ohio, 7 per cent. between Pennsylvania and Illinois, 10 per cent. west and northwest of Chicago, 10 per cent. west and southwest of St. Louis, and 9 per cent. in the South east of the Mississippi.

All this country was suffering from bad crops in November in 1881, but it did not feel the full effect of them so early, and was still profiting from the good crops of 1881; and in 1882, while it was getting the benefit of the good crops of that year, it had not yet got over the effects of the bad crops of 1881.

Below we give the November earnings per mile for 53 roads for the last six years:

	1877.	1878.	1879.	1880.	1881.	1882.
Ala. Gt. Southern	....	....	$171	$211	$270	$338
Atch., Top. & S. F	$429	$506	667	575	741	727
Burl., C. R. & North	337	298	341	385	355	404
Central of Ga	715	670	...	....	589	567
Central Iowa	464	373	....	507	436	436
Central Pacific	999	705	933	898	828	707
Chesapeake & Ohio	....	....	....	508	529	557
Chicago & Alton	578	589	716	829	794	883
Chic. & East. Ill	426	473	556	570	593	661
Chic. & N. W	612	657	695	682	671	598
Chic., Mil. & St. P.	632	468	504	409	397	473
Chic., St. P., Minn. & Om	....	....	401	416	409	484
Cin., Ind., St. L. & Chic.	551	585	720	697	617	571
Cleve., Akron & Col	229	220	215	248	264	305
Col., Hocking V. & Tol.	605	597	655	821	773	813
Denver & Rio Grande	267	351	387	741	542	442
Des Moines & Ft. Dodge.	....	....	206	369	424	296
Det., Lansing & North	....	....	446	512	540	614
Eastern	726	680	707	851	961	936
E. Tenn., Va. & Ga	....	364	....	372	328	381
Flint & Pere Marquette	....	349	407	484	523	595
Gulf, Col. & S. F	....	....	....	403	411	506
Hannibal & St. Jo.	590	711	665	709	670	853
Hous., E. & W. Tex	....	....	....	105	210	244
Ill. Cen., in Illinois	641	583	575	661	624	623
Ill. Cen., in Iowa	360	318	350	436	409	429
Ind., Bloom. & West	236	442	435	383	361	370
Int. & Gt. Northern	358	454	465	461	466	478
Lake Erie & West	....	....	220	256	281	345
Louisville & Nash	559	658	623	518	526	589
Marq. H. & Ont.	....	....	329	403	751	937
Mil., Lake Shore & W	....	....	....	192	221	257
Mo., Kan. & Texas	354	402	479	446	532	534
Mobile & Ohio	480	602	611	497	520	550
Nash. Chat. & St. L.	456	450	384	389	437	521
N. Y. & New England	....	....	550	667	676	692
Norfolk & Western	377	411	420	488	535	610
Northern Central	1,143	1,117	1,158	1,408	1,494	1,616
Northern Pacific	....	....	327	417	489	536
Pennsylvania	1,717	1,677	1,673	1,893	1,905	2,209
Peoria, Dec. & Ev.	....	....	124	193	222	211
St. L., A. & T. H.,						
Main Line	....	392	518	599	541	685
Belleville Line	663	722	739	596	531	598
St. L., Iron Mt. & So.	669	782	959	923	1,003	1,042
St. L. & San Francisco	345	363	411	480	441	502
St. P., Minn. & Man.	....	....	378	458	587	862
Scioto Valley	139	275	263	288	342	361
South Carolina	559	483	518	475	553	624
Texas & Pacific	573	630	651	568	377	443
Toledo, Cin. & St. Louis	....	....	....	134	149	154
Union Pacific	....	....	647	726	746	752
Wab., St. L. & Pacific	....	....	399	456	407	445
Wisconsin Central	....	....	183	249	151	170

Here the number of roads reporting for each year and the number which in any other November had larger earnings per mile than this year were:

Of 53	roads,	10	had	larger	earnings	per mile in	1881
Of 52	"	13	"	"	"	"	1880
Of 45	"	9	"	"	"	"	1879
Of 36	"	8	"	"	"	"	1878
Of 32	"	8	"	"	"	"	1877

Thus in none of the previous years did the roads do nearly so well as in 1882. Of the 53 roads in the list, 32 made greater earnings in November this year than in any previous year reported:

Lake Shore Earnings, Expenses and Profits for the Last Quarter.

In reviewing the statements of the Vanderbilt roads west of Buffalo last week, we showed that the profits in the last half of the year had been much greater than in the first half, those of the Lake Shore having been $6.10 in the last half and but $2.27 in the first half. We then said that by far the larger part of the profits of the last half year must have been made in the latter part of it, as the harvest had but little effect on the business of the roads until September. So far as the Lake Shore is concerned we are able to give the figures definitely for the two last quarters of the year, by means of its report to the New York State Engineer and Surveyor for the year ending Sept. 30, filed last week at Albany. Having the figures for the two halves of the year and for the last quarter of last year, by taking the sum of the earnings, expenses, etc., of the last quarter of 1881 and the first half of 1882 from the figures for the year ending with September, we have the figures for the quarter ending with Septem-

ber; and by taking the figures of this quarter from those for the last half of 1882, we have the figures for the last quarter of the year, which most nearly represent the present condition of the road's business. We give below the figures so ascertained, for three successive years, for the first half of the year, and each of the two following quarters which make up the calendar year:

Lake Shore Earnings, Expenses and Profits.

Six mos., Jan. to June:	1880.	1881.	1882.
Gross earnings	$9,072,993	$8,954,926	$8,026,200
Expenses	5,019,384	5,285,164	5,403,791
Net earnings	$4,053,609	$3,669,762	$2,622,409
Fixed charges	1,375,188	1,362,000	1,500,000
Surplus	$2,678,421	$2,307,762	$1,122,409
Per share	$5.40	$4.66	$2.27
3 mos., July to Sept.:			
Gross earnings	$4,799,602	$4,445,647	$3,774,962
Expenses	*2,689,723	2,931,683	2,789,800
Net earnings	$2,109,879	$1,514,564	$1,984,162
Fixed charges	687,594	681,000	745,000
Surplus	$1,422,285	$833,564	$1,239,162
Per share	$2.88	$1.69	$2.50
3 mos., Oct. to Dec:			
Gross earnings	$4,876,865	$4,570,818	$5,474,838
Expenses	†2,708,997	3,062,182	2,931,409
Net earnings	$2,167,868	$1,508,636	$2,543,429
Fixed charges	687,594	682,376	745,000
Surplus	$1,480,272	$826,260	$1,798,429
Per share	$3.00	$1.67	$3.60

*Including $161,000 for additions to car equipment.
†Including $203,400 for additions to car equipment.

Thus we see that *nearly three-fifths* of the company's large profits in the last half of 1882—$3.60 out of $6.10 per share—were made in the last quarter of the year, and that the profits then were one-fifth greater than in 1880 even—that the road is just now doing an extraordinarily profitable business.

In the first half of the year, suffering from war rates and light crops, the net earnings were 28 per cent. less than in 1881, and 35 per cent. less than in 1880, when traffic was heavy and rates were maintained: in the third quarter of the year, when rates were maintained, but the crop movement was light about half the time, and the comparison was with the beginning of the railroad war in 1881, there was an increase of 38 per cent. in net earnings, though they were less than in 1880, when rates were higher and through freight heavier, in the last quarter, during which all traffic was good, but rates a little lower than in 1880 and 1879, the gross earnings were 20 per cent. and the net earnings 67 per cent. more than in 1881, and the gross earnings 12 per cent., and the net earnings 17½ per cent. more than in 1880.

That the profit should have been $3.60 per share in the last quarter of 1882, against $3.00 in the exceptionally prosperous year 1880 may seem surprising. But though through rates were a little lower in 1882 than in 1880, and through east-bound freight no greater, almost all other traffic was materially greater, and passenger rates were probably better maintained than ever before. Moreover, in this quarter in 1880, the Lake Shore charged to expenses $203,400 which is paid for *additions* to its stock of cars—properly chargeable to construction. But for this, the profit per share then would have been $3.41 instead of $3.00.

It will be noted that the Lake Shore's expenses in 1882, though slightly (1½ per cent.) less than in 1881, were $707,000 (7 per cent.) more than in 1880, though in the latter year $700,000 went for new cars. This of itself indicates that the traffic was larger last year. There was some increase in the elements of expenses from 1880 to 1881, but little or none afterward.

It seems hard for some to believe that a railroad company which in half of a year earned but $2.27 per share, in a single quarter of the same year could earn $3.60. But, though the latter rate of profit is exceptionally high, the fluctuations are common enough—indeed, a great deal to common; and on this road too. Expenses are not likely to be very evenly distributed among the several months or quarters of the year, and exceptionally heavy expenses may happen to come at a time of war rates and light traffic. When there are protracted snow blockades traffic is likely to be very light, while expenses are extraordinary. And as fixed charges keep on the same whether business be bad or good, the surplus available for dividends varies still more than the net earnings. In 1879, when the profits per share averaged 60 cents per month, in two consecutive months they fell below 18 cents, in another were $1.16. In the last quarter of that year, by the way, these profits were $3.12, or more than in 1880; in another three months of the same year they were but 70 cents. And in 1878 there was one month when the profits over fixed charges were but $29,842, which is but 6 cents a share.

As through freight traffic was not unusually heavy in the last quarter and rates lower than in the corresponding quarters of previous years except 1881 and 1876, and as the Lake Shore had a somewhat smaller proportion of it than in previous years, the Lake Shore's very large profits then evidently were due to an unusually large local traffic, more travel and better maintained rates on through passengers and emigrants. And the fact that it thus depends less than formerly on its through traffic is a decidedly favorable sign, though while the through traffic is that which will be most diverted by new roads and on which rates are most uncertain, it is probably more certain to grow without interruption from financial troubles than the local traffic. A collapse of railroad and other building, and a restriction of manufacturing and mining industries might very greatly reduce local traffic on many roads, while the east-bound through traffic would probably continue to grow and grow faster than before, perhaps.

November Accidents.

Our record of train accidents in November, given in full on another page, shows for that month 125 accidents, in which 36 persons were killed and 129 injured. The list includes 66 collisions, in which 14 persons were killed and 53 injured; 56 derailments, in which 22 were killed and 75 hurt, and three other accidents, in which one person was hurt.

Twenty-six of the killed and 81 of the injured were railroad employés, while 10 of the killed and 48 of the injured were passengers or others riding on the trains. Employés constituted 72.2 per cent. of the killed, 62.8 per cent. of the injured and 64.8 per cent. of the whole number of casualties.

In 20 of these accidents one or more persons were killed; in 31 there was injury but not death, leaving 74, or 59.2 per cent., of the whole number, in which there was no injury worth recording.

As compared with November, 1881, there was a decrease of 8 accidents, a decrease of 14 killed and an increase of 9 in the number injured.

These accidents are classed according to their nature and causes as follows:

COLLISIONS:		
Rear collisions	45	
Butting collisions	17	
Crossing collisions	4	
		— 66
DERAILMENTS:		
Broken rail	1	
Broken frog	1	
Broken bridge	1	
Spreading of rail	9	
Broken wheel	3	
Broken tire	1	
Broken axle	2	
Broken truck	7	
Accidental obstruction	1	
Cattle on track	2	
Misplaced switch	6	
Runaway train	1	
Rail removed for repairs	1	
Open draw	1	
Malicious obstruction	4	
Unexplained	20	
		— 56
Boiler explosion		1
Cylinder head blown out		1
Car burned while running		1
Total		125

Five collisions were caused by trains breaking in two; four by misplaced switches; three by mistakes in orders or failure to obey them; two by neglect to use signals properly; one each by fog, by a runaway train, by failure of brakes, by cars blown out of a siding, by a flying switch, by carelessly running too fast and by carelessness in running cars over the end of a siding.

For the one broken bridge no special cause is assigned, and no particulars as to the kind of bridge, its age or the cause of its failure have been received.

A general classification of these accidents is as follows:

Causes:	Collisions.	Derailments.	Other.	Total.	P.c. of total.
Defects of road	..	12	..	12	9.6
Defects of equipment	6	7	2	14	11.2
Negligence in operating	58	8	..	67	53.6
Unforeseen obstructions	2	4	1	7	5.6
Maliciously caused	..	4	..	4	3.2
Unexplained	..	21	..	21	16.8
Total	66	56	3	125	100.0

More than half the accidents were thus directly chargeable to negligence in operating, and could have been prevented.

There were 71 accidents in daylight and 50 at night, while in four cases the time is not definitely stated.

A division according to classes of trains and accidents is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains	6	19	1	26
To a pass. and a freight	24	..	..	24
To freight trains	36	37	2	75
Total	66	56	3	125
Casualties:				
Killed by	14	22	..	36
Injured by	53	75	1	129
Total	67	97	1	165

Accidents are thus recorded to 191 trains, of which 56, or 29.4 per cent., were passenger trains, and 135, or 70.6 per cent., were freight trains.

As we have before remarked, the real proportion of freight train accidents to the whole number is probably greater than this, but the freight accidents are far more likely to escape notice and record.

The month does not present any remarkable features, except in the number of collisions, which exceeded that of derailments, an unusual feature. There was a general absence of snow, rain storms and other causes which usually produce many derailments at this season, but there was, apparently, no lack of the carelessness among trainmen and the general laxity of management, which are the fruitful causes of collisions.

The removal of a rail for repairs without putting out signals appears again, as it does nearly every month. One train ran into an open draw, and, as usual, there is a conflict of testimony, the engineer claiming that the signals were not properly displayed, and the bridge-tender that the engineer did not regard them. There were four malicious derailments during the month.

For the year ending with November the record is as follows:

	Accidents.	Killed.	Injured.
December	113	36	96
January	137	41	198
February	88	23	69
March	99	29	101
April	81	18	61
May	94	24	86
June	72	35	193
July	92	18	56
August	139	46	218
September	153	34	136
October	136	47	132
November	125	36	129
Total	1,329	387	1,475
Totals, same months, 1880-81	1,480	407	1,642
" " " 1879-80	1,012	304	1,103
" " " 1878-79	904	183	695

The averages per day for the month were 4.17 accidents, 1.20 killed and 4.30 injured; for the year they were 3.67 accidents, 1.06 killed and 4.04 injured.

The average casualities per accident were, for the month, 0.288 killed and 0.032 injured; for the year, 0.291 killed and 1.110 injured.

The averages per month for the year were 111 accidents, 32 killed and 123 injured, against similar averages of 123 accidents, 34 killed and 137 injured in 1880-81; 84 accidents, 25 killed and 92 injured in 1879-80; 77 accidents, 15 killed and 58 injured in 1878-79.

The number of accidents in November was exceeded in four months of the year, the number of killed in three and the number of injured in five out of the twelve months.

The Chicago, Burlington & Quincy.

The Chicago, Burlington & Quincy has had a reputation as one of the soundest and strongest of dividend-paying roads; almost beyond the reach of accident or disaster which could reduce its dividends. In all the bad years following 1873 it never failed to pay 8 per cent. dividends (before it had paid 10), and it has moreover been a growing property, and gave its stockholders from time to time an opportunity to invest more money in 8 per cent. stock at par, or even still more profitable distributions of stock. The stock was formerly held in great blocks by large capitalists, who were almost always ready to buy more, but never wanted to sell, so that it suffered comparatively less than most railroad stocks from fluctuations of business or other accidents; confidence was general where it was much held (more in New England than in New York) that nothing would hurt it much. But the stock is now much more distributed, and the holders seem no longer to have the great confidence in the property that once prevailed. Although the company has announced all the additions to its stock and bonds before they were issued, and has made monthly statements of expenses as well as earnings, when a summary statement of them at this time compared with last year was made in Boston last week, the stock fell suddenly, as if some concealed weakness had been brought to light.

The capital stock of the company was $55,337,447 at the end of 1881. In accordance with an agreement made in 1881, stock was issued for $7,895,000 Republican Valley stock scrip; carrying dividends from that date; on June 30, new stock to the amount of 10 per cent. of the old was issued at par (to stockholders), to pay for the recently acquired Chicago & Iowa, St. Louis, Keokuk & Northwestern, and Keokuk & Northwestern roads—306 miles. In this way the stock has been brought up to $69,814,191. The issue of April 1 gets three quarterly dividends from the earnings of 1882; the issue of June 30 only two—one less on each paid during 1882. The length of road has been brought up from 2,772 miles at the end of 1880 to 2,924 at the end of 1881, and about 4,100 at the end of 1882, according to a recent statement. During last year the funded debt was also increased nearly $12,000,000, to $71,000,000, issued on the Denver extension and other new road. The total capital thus now amounts to the enormous sum about $141,000,000, but then it represents about 4,100 miles of road in the most fertile part of the whole West, and the older part in a country as thickly peopled and prosperous as any in the West; and a capital of $34,400 per mile is extremely light for such a system; very few roads anywhere have a lighter one; none, we imagine, that has so good and so thoroughly equipped a road as the Chicago, Burlington & Quincy.

But last year was a bad year for this road, as for all Western roads, only more so. It is the great corn road, and consequently the great hog road, of the world, and the failure of the corn crop in 1881 made the corn movement extremely light throughout the year 1882.

The figures for 1880 and 1881, showing the total Chicago receipts of corn and hogs in those years and its receipts by the Chicago, Burlington & Quincy road, and the total Chicago receipts in 1882 will illustrate:

	1880.	1881.	1882.
Total corn receipts, bu.	97,272,844	78,393,315	49,224,522
Corn by C., B. & Q.	40,919,063	27,733,042	.....
Total hog receipts, No.	7,148,457	6,527,679	5,869,807
Hogs by C., B. & Q.	2,156,432	2,043,775	....

The Burlington road thus carried 46 per cent. of all the corn, and 30 per cent. of all the hogs received in Chicago in 1880 and 35 per cent. of the corn and 31 per cent. of the hogs in 1881.

As yet we have not the receipts by the Chicago, Burling-

RAILROAD EARNINGS IN NOVEMBER.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1882.	1881.	Inc.	Dec	P.c.	1882.	1881.	Increase.	Decrease.	P. c.	1882.	1881.	Inc.	Dec.	P. c.
						$	$	$	$		$	$	$	$	
Ala. Gt. Southern	290	290	....	....	....	98,097	78,257	19,840	.....	25.4	338	270	68	.....	25.4
Atchison, Top. & S. F.	1,832	1,760	72	....	4.1	1,331,470	1,303,385	28,085	.....	2.2	727	741	....	14	1.9
Bur., Ced. Rap. & No.	69	570	120	....	21.1	278,429	202,180	76,249	.....	37.7	404	355	49	....	13.8
Central, of Georgia*	726	712	14	....	1.9	411,800	419,554	.....	7,754	1.9	567	589	....	22	3.7
Central Iowa	244	210	34	....	16.1	106,353	91,573	14,780	.....	16.1	436	436	....	....	....
Central Pacific	3,170	2,775	395	....	14.1	2,242,000	2,297,971	.....	55,971	2.4	707	828	....	121	14.6
Ches. & Ohio	517	435	82	....	18.9	287, 50	230,222	57,628	.....	25 1	557	529	28	.....	5.3
Chicago & Alton	847	847	....	....	....	748,152	672,380	75,772	.....	11.3	883	794	89	.....	11.3
Chi. & Eastern Ill.	245	232	13	....	5.7	162,008	139,473	24,535	.....	17.9	661	593	68	.....	11.5
Chi., Mil. & St. Paul	4,380	3,950	430	....	10.9	2,072,000	1,569,597	502,403	.....	32.0	473	397	76	.....	19.1
Chi. & Northwe-tern	3,460	3,010	450	....	14.9	2,069 287	2,019,038	50,248	.....	2.5	598	671	....	73	10.9
Chi., St. P., M. & O	1,070	960	110	....	11.5	517,595	392,921	124,674	.....	31 7	484	409	75	.....	18.6
Chi. & West Mich.	404	367	37	....	10.8	131,559	114,620	16,939	.....	14.7	326	312	14	.....	4.6
Cin., Ind., St L. & Chi.	384	342	42	....	12.3	219,732	211,014	8,718	.....	4.0	571	617	....	46	7.4
Cin., N. O. & T. Pac.	336	336	....	....	....	242,932	225,937	16,99	.....	7.6	723	672	51	.....	7.6
Cleve., Akron & Col.	144	144	....	....	....	43,963	38,061	5,96	.....	15.9	305	264	41	.....	15.9
Col., Hock'g V. & Tol.	3 0	320	....	....	....	260,053	247,382	12,671	.....	5.1	813	773	40	.....	5.1
Denver & R. G	1,169	1,008	152	....	15.1	512,965	547,055	.....	34 090	6.2	442	543	....	101	18.6
Des M. & Ft. Dodge	108	84	24	....	28.6	32,001	35,655	.....	3,654	10.3	296	424	....	128	30.2
Det., Lan. & Nor.	226	226	....	....	....	138,840	121,992	16,848	.....	13.8	614	540	74	.....	13.8
Eastern	284	284	....	....	....	266,000	273,067	.....	7,067	2.6	936	961	....	25	2.6
E. Tenn., Va. & Ga.*	900	900	....	....	....	343,173	304.237	38,936	.....	12.8	381	338	43	.....	12.8
Evansv & T. H.*	146	146	....	....	....	59,445	51,889	7,556	.....	14.5	407	355	52	.....	14.6
Flint & Pere Mar	345	318	27	....	8.5	205,190	166,448	38,742	.....	23.3	595	523	72	.....	13.8
G'n B., Win. & St. P.*	220	220	....	....	....	44,323	41 720	2,603	.....	6.2	202	190	12	.....	6.2
Gulf, Col. & S F.	483	320	163	....	50.9	244,597	131,425	113,172	.....	86.3	506	411	95	.....	23.7
Hannibal & St. Jo.	292	292	....	....	....	249,225	195 619	53,606	.....	27.4	853	670	183	.....	27.4
Houston, E. & W. Tex.	104	88	16	..	18.2	25,405	18,487	6,918	.....	34.8	244	210	34	.....	16.2
Houston & Tex. Cen*	522	522	....	....	....	409,000	343,857	66 143	.....	19.2	785	659	126	.....	19.2
Ill. Cen., Ill. lines	930	918	12	....	1.3	579,415	572,549	6,870	.....	1.2	623	624	....	1	0.1
Iowa lines	402	402	....	....	....	172,72	164,678	8,047	.....	4.9	429	409	20	.....	4.9
Ind. Bloom. & West.	695	555	140	....	25.2	256,89	200,451	56,547	.....	28.2	370	361	9	.....	2.5
Kan. City, F. Scott & G.	360	320	40	....	12.5	179,662	143,340	36,322	.....	25.4	499	448	51	.....	11.3
Lake Erie & Western	386	386	....	....	....	133,297	108,376	24,927	.....	23.1	345	281	65	.....	23.1
Little Rock & Ft. S.*	168	168	....	....	....	90,346	65,366	24,980	.....	38.4	538	389	149	.....	38.4
Little R., Miss. R. & T.*	173	156	17	....	10.9	44,910	32 036	12,874	.....	40.2	260	205	55	.....	26.5
Long Island	335	335	....	....	....	170,775	141,338	29,438	.....	20.9	510	422	88	.....	20.9
Louisville & Nash	2,025	2,025	....	....	....	1,192,990	1,065,223	127,167	.....	12 0	589	526	63	.....	12
Louisv., N. A. & Chi.*	380	290	90	....	31.0	122 000	88,000	34,000	.....	38.6	321	303	18	.....	5.9
Mar., Hought & Ont.	97	88	9	....	10 2	90,891	66,051	24,840	.....	38.0	937	751	186	.....	24.8
Mil., L. S. & West.	305	260	45	....	17.3	78,518	57,540	20,978	.....	36.5	257	221	36	.....	16.3
Mo. Pacific lines:															
Central Branch	387	300	87	....	29.0	128,864	80,387	48,477	.....	60.5	333	268	65	.....	24.2
Int. & Gt. Northern	775	650	125	....	19.2	371,378	303,003	68,375	.....	22.6	478	466	12	.....	2.6
Mo., Kan. & Tex.	1,300	1,003	297	....	29.5	694,109	543,957	150,152	.....	30.9	534	532	2	.....	0.4
Mo. Pacific	980	800	180	....	22.5	781,258	550,469	230,789	.....	42.0	797	688	109	.....	15 6
St. L. I. M. & So.	810	685	125	....	18.3	844,975	687,271	157,702	.....	22.8	1,042	1,003	39	.....	3.9
Texas & Pacific	1,400	980	420	....	42.9	619,056	369,521	249,135	.....	67.6	443	377	66	.....	17.5
Mobile & Ohio	5 8	506	22	....	4.3	295.119	262,986	32,124	.....	12.2	559	520	39	.....	7.5
Nash., Chat. & St. L†	348	348	....	....	....	181,336	152.059	29,277	.....	19.2	521	437	84	.....	19.2
N. Y. & N. England	399	356	43	....	12.1	276,184	240,761	35,420	.....	14.7	692	676	16	.....	2.4
Norfolk & Western	428	428	....	....	....	261,235	228,995	32,240	.....	14.1	610	535	75	.....	14.1
Northern Central	326	326	....	....	....	526,685	487,160	39,525	.....	8.1	1,616	1,494	122	.....	8.1
Northern Pacific	1,420	972	448	....	46.1	761,324	475,611	285,713	.....	60.1	536	489	47	.....	9.6
Ohio Cent al	232	232	....	....	....	103,463	81,935	21,528	.....	26.2	446	355	91	.....	25.2
Ohio & Mississippi*	616	616	....	....	....	421,161	343,793	77,368	.....	22.5	684	558	126	.....	22.5
Ohio Southern*	138	128	10	....	7.8	36,625	30,414	6,211	.....	20.6	265	238	27	.....	11.3
Pennsylvania‡	1,930	1,925	55	....	2.8	4,373,925	3,840,215	533,610	.....	13.9	2,209	1,995	214	.....	10.8
Peo., Dec. & Evansv.	253	248	6	....	2.4	53,474	55,06	.....	1,586	2.9	211	222	....	11	5.0
Rich. & Danville	773	766	7	....	0.9	3 32,922	377,711	.....	14,789	3.9	469	493	....	24	4.8
St. L., A. & T. H., M. Li'e Belleville Line	195	195	....	....	....	133,630	105,506	28,124	.....	26.5	685	541	144	.....	26.5
	121	121	....	....	....	72,410	64,289	8,121	.....	12.7	598	531	67	.....	12.7
St. Louis & Cairo	146	146	....	....	....	36,160	36,187	.....	27	0 1	248	248	....	....	....
St. Louis & San Fran.	690	645	15	....	2.4	311,490	264,321	47.169	.....	16.6	502	441	61	.....	13.9
St Paul & Duluth	175	175	....	....	....	127,928	78,282	49,646	.....	63.6	731	447	284	.....	63.6
St. P., Minn. & Man	1,060	863	194	....	22.4	913,314	508,530	404,804	.....	79.6	862	587	275	.....	46.8
Scioto Valley	128	128	....	....	....	46,296	43,802	2,464	.....	5.6	361	342	19	.....	5.6
South Carolina	243	243	....	....	....	151,681	134 309	17,372	.....	12.9	624	553	71	.....	12.9
Tol., Cin. & St. L.	550	435	115	....	26.4	81,899	65,000	16,899	.....	30 6	154	149	5	.....	3.4
Union Pacific	3,750	3,650	100	....	2.7	2,821,070	2,723,608	97,462	.....	3.6	752	746	6	.....	0.8
Vicks. & Meridian*	142	142	....	....	....	59, 95	58,745	853	.....	1.5	419	413	6	.....	1.5
Va. Midland	352	352	....	....	....	129,389	119,538	9,851	.....	8.2	368	340	28	.....	8.2
Wab., St. L. & Pacific.	3,425	3,300	125	....	3.8	1,525,715	1,343,557	182 158	.....	13.6	445	407	38	.....	9.3
Wisconsin Central	390	390	....	....	....	66,254	58,818	7,406	.....	12.6	170	151	19	.....	12.6
Total. 74 roads	54,816	49,908	4,908	....	....	34,596,013	30,063,670	4,670,049	137,706	.....	631	602	29	.. ..	.....
Total inc. or dec	... ..	.....	4,908	...	9.8	.....	.....	4,532,343	.....	15.1	.....	.....	29	.....	4.8
SUPPLEMENTARY TABLE.															
Met. Elevated	18	18	....	....	....	215,665	228,502	.....	12,837	5.6	11,981	12,695	.....	714	5.6
N. Y. Elevated	14	14	....	....	....	349,449	56,425	.....	.....	27.8	22,562	18,532	4,030	.....	27.8
Oregon Ry & Nav. Co.§	2,150	1,960	190	....	9.7	465,800	463,284	2,516	.....	0.5	217	236	... .	19	8.1

* Not in the table of earnings for the eleven months.
† Does n t include branch or leased lines.
‡ Includes all lines east of Pittsburgh and Erie.
§ Railroad, 575 miles; steamboat and steamship lines, 1,575 miles.

ton & Quincy in 1882, but they probably decreased in proportion to the total, and the total Chicago corn receipts were 37 per cent., and its hog receipts 10 per cent. less than in 1881. Now this was a temporary disaster, not much affecting the growth of the country. The last corn crop, which has now only begun to move, is a fair one over all the Burlington's lines, and said to be very good in Kansas and Nebraska. The effect of crop failures of 1881 is seen in the fact that with the large increase in mileage (most of which was worked less than half of the year, however), the gross earnings have not increased, but, on the contrary, an estimate just before the year closed makes them $21,200,000 in 1882, against $21,324,150 in 1881, and $20,492,046 in 1880; and there is also a decrease of $200,000 in net earnings, to $10,057,000.

These figures are given in a statement telegraphed from Boston, which says also that the dividends for the year will amount to $5,028,495, and the fixed charges to $4,972,324, so that the profits will exceed the dividend by the very narrow margin of $56,000, though there will be about $1,320,000 more received from sales of land. This is unfavorable only because it is less favorable than the results in some previous years. In 1881 there was a surplus of $1,479,981, a million of which went into an improvement fund; and in 1880 the surplus was $3,000,000. Or, putting it in another shape, the earnings per share were but $9.10 in 1882, against $11.90 in 1881 and $14.70 in 1880.

Doubtless 1882 was a bad year for this road, but that has been shown from month to month by its reports of earnings and expenses; and its increase of stock and debt requires that its profits shall be as large as heretofore if its rate of dividend is kept up. But as in spite of the fact that the crops on the road were perhaps the worst ever known, the company appears to have earned its 8 per cent. dividend, and there is the material for a good traffic for the coming year, when, too, the new roads will be earning something, it looks as if the company was strong, rather than weak. We can bear fluctuating earnings if the fluctuations never bring the profits below 8 per cent. But the fact is the country seems to be only just appreciating the great injury from the bad harvests of 1881. We ceased to carry the small grains of that harvest about September last; but the effect on traffic seems never to have troubled investors much until the annual reports began to appear, months after the bad year was over, and when most roads appear to be doing exceptionally well.

The Recent Course of Grain and Flour Exports.

The exports of breadstuffs from the United States for the 11 months ending with November, the five months from July to November, and in November are reported as follows by the Bureau of Statistics, flour and meal reduced to bushels:

November:	1882.	1881.	Inc. or Dec.	P. c.
Wheat	8,825,845	9,707,810	D. 881,965	9 1
Flour	3,882,739	2,177,077	I. 1,705,662	78.3
Wheat and flour	12,708,584	11,884,887	I. 823,697	6.9
Corn	706,853	4,307,022	D. 3,600,169	83.6
Other grain	337,676	297,763	I. 39,913	14 4
Total	13 753,113	16,489,672	D. 2,736,559	16.6
Value	$15,306,494	$18,025,880	D. $2,719,386	15.0

The decrease in wheat exports for the month is more than made good by a great increase in the flour exports. But corn exports were reduced five-sixths, and were not as much as they commonly are in a single week, and this made the total exports one-sixth less than in November last year.

For the five months ending with November the exports have been:

Five months:	1882.	1881.	Inc. or Dec.	P. c.
Wheat	67,481,659	51,569,664	I. 15,911,995	30.9
Flour	15,763,990	10,979,500	I. 4,784,490	43.6
Corn	3,285,967	31,344,239	D. 28,058,272	89.5
Other grain	1.037,396	847,468	I. 189.928	22.4
Total	87,569,012	94,740,871	D. 7,171,859	7.6
Value	$100,750,452	$98,337,515	I. $2,412,937	2.5

In flour and wheat together the increase is less than nearly 20,700,000 bushels, or 33⅓ per cent., but the enormous falling off of corn exports—nearly nine-tenths—makes a decrease in the total grain exports for the five months. The value of the exports, however, was slightly greater this year.

We may compare the exports of these five months with those for the first half of the year, which were:

	1882.	1881.	Decrease.	P.c.
Wheat	32,863,728	58,244,986	25,381,258	43.6
Flour	13,000,275	17,422,965	4,422,690	25.4
Corn	10,626,981	40,425,073	29,798,092	73.7
Other grain	787,215	828,024	40,809	4.9
Total	57,277,199	116,921 048	59,643.849	51.0
Value	$61,856,241	$ 11,980,917	$47,124,676	42.1

Thus in the first half of the year there was a large decrease in all grain exports, since which time there has been a great improvement in everything except corn.

Of the wheat exports in November this year, 38 8 per cent. went from San Francisco, 33 5 from New York, 13 1 from Baltimore, 6.1 from Portland, Or., 4.7 from Philadelphia, 2.4 from New Orleans, and 1.4 from Boston. Of the flour receipts 45.3 per cent. went from New York, 19.2 from Boston, 13.8 from San Francisco, 5.8 from Baltimore, 3.8 from Philadelphia, 3.4 from Port Huron, 2.6 from Portland, Or., 1.9 from New Orleans, and 1.8 per cent. from "Yorktown," which is probably the customs district including the terminus of the Chesapeake & Ohio Railroad, which has never before been credited with exports.

Of the export *values* for the five months and the 11 months ending with November, the following percentages went from each principal ports this year and last:

	Five months.		Eleven months.	
	1882.	1881.	1882.	1881.
New York	41.2	43 9	42.0	44.0
San Francisco	15.2	17.2	20.0	13 7
Baltimore	16.3	15.0	13.3	16.0
Boston	6.2	6.2	6.8	6.8
Philadelphia	6.0	7.1	4.9	7.7
New Orleans	5.5	2.3	3.8	4.6
Chicago	2.7	1.9	2.2	1.5
Toledo	2.3	0.8	1.5	0.7
Portland, Or	1.7	2.7	2.0	2.2
Port Huron	1 0	1.3	1.0	1.1
Other ports	1.9	1 6	1.6	1.7
Total	100.0	100.0	100.0	100.0

The reports of Chicago, Toledo and Port Huron are to Canadian ports. Canada is largely supplied with corn and to some extent with flour from this country, though it exports much wheat.

Of the total value of breadstuffs exported from the five Atlantic ports, the percentage from each port was:

	Five months.		Eleven months.	
	1882.	1881.	1882.	1881.
New York	54.7	59.0	59.3	55 7
Boston	8.3	8.3	9.6	8 6
Philadelphia	8.0	9.5	6.9	9.7
Baltimore	21.7	20.1	18.8	20.2
New Orleans	7.3	3.1	5 4	5.8
Total	100.0	100.0	100.0	100.0

Baltimore has done better since harvest because it first had the new winter wheat to export, and New Orleans has profited in the same way. The effect of this crop is already much less than it has been, as may be seen by the percentages of these ports in November, which were:

New York.	Boston.	Philadelphia.	Baltimore.	New Orleans.
61.6	13.2	6.7	15.4	3.1

Thus Baltimore and New Orleans, which exported 30⅓ per cent. of the total from the five ports in the four months ending with October, exported but 18.5 per cent. in November. Should we make large corn exports after this month, which seems quite probable, these ports should again have a large proportion of the business.

Pennsylvania Railroad Organization.

The recent articles on the "Organization of the Pennsylvania Railroad" were at fault so far as they left on the reader's mind the impression that the new office of General Superintendent of Motive Power retains any of the details which were, and to a degree remain, part of the duty of the Superintendent of Motive Power of the Pennsylvania Railroad Division, or that the latter office has now any care over the maintenance of standards, as an ambiguous sentence seemed to imply.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Atlantic & Pacific.—Extended westward to Yampai, Arizona, 16 miles.

Batesville & Brinkley.—Extended from Cotton Plant, Ark., north to Colona, 14 miles. Gauge, 3 ft.

Bridgeton & Saco River.—Completed from Hiram Junction, Me., northward to Bridgeton, 16 miles. Gauge, 2 ft.

Chicago, Milwaukee & St. Paul.—The *Cannon Valley Branch* is extended from Cannon Falls, Minn., east to Red Wing, 20 miles. A branch of the *Chippewa Valley Division* is completed from Menominee, Wis., to Cedar Falls, 6 miles.

Indianapolis & Evansville.—Track laid from Washington, Ind., south to Petersburg, 16 miles.

Jersey Shore, Pine Creek & Buffalo.—Track is extended 7 miles on the northern and 7 on the southern end, making 14 miles in all.

Pemigewasset Valley.—Extended from Mad River, N. H., northward 13 miles.

St. Louis, Iron Mountain & Southern.—Track is laid on the *Doniphan Branch* from Neeleyville, Mo., west to Little Black, 7 miles. Also on the *White River Branch* from Kerrigan, Ark., west by north 12 miles.

Texas & St. Louis.—Extended from Jonesboro, Ark., southwest to White River, 91 miles. Gauge, 3 ft.

This is a total of 235 miles, making 10,147 miles thus far reported for 1882.

No new track has yet been reported for 1882.

THE RIGHT OF ERIE PREFERRED STOCK TO DIVIDENDS has been the subject of a suit in the United States Circuit Court at New York, in which a decision was rendered last Tuesday. The preferred stock of this company is entitled to dividends at the rate of 6 per cent. yearly out of the net profits of the year as declared by the board of directors. The question at issue was whether this dividend must be paid whenever there are sufficient profits, or whether the directors may at their discretion pass the dividend and use the profits for other purposes, as for improvements of the property of the company. For the fiscal year ending Sept. 30, 1880, the company reported profits over fixed charges amounting to $1,790,621, while to pay 6 per cent. on the preferred stock required less than $190,000. But the directors declared it inexpedient to pay the dividend, and announced that the profits had been or would be devoted to improvements of the road. The English Voting Trustees at the time protested against this and joined in a friendly suit against the company to determine the rights of the preferred stock. This suit, we believe, was afterwards withdrawn; but the suit just decided, if not the same, was brought on the same grounds.

The Court decides that the preferred stock is entitled to its dividend when there are profits out of which it can be made, and that the fact that these profits had been used for improving the property or were needed for that purpose does not change the rights of the preferred stockholders.

The course of decisions on this subject, as we have shown heretofore, has not been uniform, and the right of preference stock may vary according to the stipulations concerning it in the company's organization. But if it is wholly at the discretion of the directors to decide whether any dividend shall be made on preferred stock, whatever the profits, it is difficult to see what advantage is insured it over the common stock. Let us say that a company has $1,000,000 of 6 per cent. preferred and $1,000,000 of common stock, and that it earns a profit of $60,000 a year, or just enough to pay the preferred dividend yearly. If now the dividend is withheld one year, the second year the company may pay 6 per cent. on the preferred and common stock alike, and there will be biennial dividends of 6 per cent. on both stocks instead of annual dividends of 6 per cent. on the preferred.

And if the profits are devoted to addition or improvements to the property the result may be substantially the same. If the profits which would pay the preferred dividend are devoted to increasing the earning power of the company long enough, it may be made to earn enough to pay dividends on both stocks, and cases are possible in which the whole value of the common stock would be created by withholding dividends on the preferred. This might very easily occur when the common stock is much less than the preferred in amount.

If the Erie preferred stock has the rights which this decision gives it, it is very nearly in the position of a perpetual income bond, with non-accumulative interest, and if the Erie common stock is worth anything, the preferred must be worth much more than it has ever sold for. There has been no year since the reorganization when the reported profits over fixed charges were not more than the amount required to pay 6 per cent. on the preferred stock.

There was a provision in the Erie reorganization, concerning the withholding of interest or a part of the interest on some classes of the bonds for a time, which makes it appear altogether probable that it was not expected or intended that the preferred stock should have dividends as soon as 1880. Interest was withheld and devoted to improving the road, according to this plan, at the very time when, according to this decision, the preferred stock must be paid a dividend. It is not probable that it was contemplated that any bondholders should do without their interest while dividends were paid on any stock; but this was perhaps an oversight, and the courts must interpret the contract as they find it.

CHICAGO RAIL SHIPMENTS EASTWARD for the week ending Dec. 21 for four successive years have been:

	1879.	1880.	1881.	1882.
Tons	42,181	59,150	54,801	60,294.

Thus the shipments this year were 10 per cent. more than in the corresponding week of last year, and a little more than in 1880. They were also larger than in any other week since the middle of February last. Of these shipments 10.5 per cent. went by the Chicago & Grand Trunk, 25 3 by the Michigan Central, 25.5 by the Lake Shore, 17.7 by the Fort Wayne, 12.5 by the Pan-handle, and 8.5 by the Baltimore & Ohio. Thus the two Vanderbilt roads together had 50.8 per cent., against their 45½ in the pool, and the two Pennsylvania roads had 30.2, against 35½ in the pool.

For seven successive weeks the Chicago shipments have been reported as follows:

Nov. 7.	Nov. 14.	Nov. 21.	Nov. 31.	Dec. 7.	Dec. 14.	Dec. 21.
43,082	44,721	50,401	57,206	23,976	49,355	60,294

For the week ending Dec. 23 the through shipments of freight to the east billed at Chicago (not including the shipments from points west billed through Chicago) were 49,341 tons this year, against 51,229 tons in the corresponding week of last year, and 52,642 tons in the previous week of this year. It is reported that several thousands of tons of freight were taken from Chicago elevators and from connecting roads during the week by the new New York, Chicago & St. Louis road.

For the week ending Dec. 30 the shipments billed at Chicago (not including those passing through Chicago to the East billed from points west of that city) were 63,699 tons, against 47,740 tons in the corresponding week of last year, and 49,341 tons in the previous week of this year. These shipments are among the largest that were ever made, exceeded only in a few weeks of January, 1882, and March, 1880. It is reported that some 6,000 tons besides were shipped by the Nickel-Plate road, which is not in the pool.

Compared with the previous year there was an increase of 860 tons in provisions, of 10,430 in grain, and of 4,666 in flour.

THE GROWTH IN REPUTATION OF AMERICAN ENGINEERS may be illustrated by the following: In 1862-3 the New York, New Haven & Hartford Railroad Company wishing to build an iron bridge over the Connecticut River, sent its Engineer to England to have his plans approved by English experts before it would adopt them. In 1882, Mr. Baker, one of the foremost of English bridge engineers, having designed a bridge of exceptional magnitude, having two spans of 1,700 ft. each, which is 100 ft. larger than the span of the Brooklyn Bridge, it was criticised by no less a person than the Astronomer Royal, Sir George Airey. Mr. Baher, in his reply to Sir George, after amply refuting his supposed objections to the strength of the bridge, says: "As a sample of foreign opinion, I would quote that of Mr. T. C. Clarke, the eminent American engineer and contractor, who has built more big bridges himself than are to be found in the whole of this country, and who has just completed a viaduct 301 ft. in height, by far the tallest in the world. Referring to the proposed bridge he writes: 'If my opinion is of any value, I wish to say that a more thoroughly practical and well-considered design I have never seen.' I need hardly say that the opinion of such a man has far more weight than that of an army of amateurs."

RAILROAD EARNINGS, ELEVEN MONTHS ENDING NOVEMBER 30.

NAME OF ROAD.	MILEAGE. 1882.	1881.	Inc.	Dec	P. c.	EARNINGS. 1882.	1881.	Increase.	Dec.	P. c.	EARNINGS PER MILE. 1882.	1881.	Inc.	Dec	P. c.
						$	$	$	$		$	$	$	$	
Ala. Gt. Southern	290	290				761,945	702,475	59,470		8.5	2,627	2,422	205		8.5
Atchison, Top. & S. F.	1,815	1,650	165		10.0	13,296,828	11,125,756	2,171,067		19.5	7,326	6,745	583		8.7
Bur., Cedar Rap. & No.	634	565	69		12.2	2,554,617	2,026,224	528,393		26.1	4,029	3,586	443		12.3
Central Iowa	244	195	49		25.1	1,062,849	865,491	197,358		22.9	4,356	4,438		82	1.9
Central Pacific	2,995	2,670	325		12.2	23,708,176	21,868,920	1,839,256		8.4	7,916	8,191		275	3.4
Ches. & Ohio.	490	435	55		12.6	3,068,729	2,497,829	570,900		22.8	6,263	5,742	521		9.6
Chi & Alton	847	842	5		0.6	7,466,074	6,910,928	555,096		8.0	8,815	8,208	607		7.4
Chi. & Eastern Ill.	234	222	12		5.4	1,637,240	1,487,358	149,902		10.1	6,997	6,700	297		4.5
Chi. & Gd. Trunk*	335	335				2,044,506	1,423,302	621,224		43.6	6,103	4,249	854		43.6
Chi., Mil. & St. Paul.	4,280	3,825	455		11.9	18,423,000	15,171,187	3,251,813		21.4	4,304	3,966	338		8.3
Chi. & Northwestern.	3,323	2,845	478		16.5	22,110,594	19,993,732	2,116,862		10.6	6,654	7,028		374	5.3
Chi., St. P., Minn. & O.	1,047	954	93		9.7	4,569,843	3,589,346	1,010,497		28.1	4,393	3,762	631		16.8
Chic. & West Mich.	373	367	6		1.6	1,370,207	1,203,154	167,053		13.9	3,673	3,278	395		12.1
Cin., Ind., St. L. & Chi.	372	341	41		12.4	2,418,174	2,199,563	218,611		9.9	6,500	6,645		145	2.2
Cin., N. O. & Tex. Pac	336	336				2,334,542	2,121,450	213,092		10.5	6,946	6,314	642		10.5
Cleve., Akron & Col	144	144				466,291	385,725	80,566		20.8	3,238	2,679	559		20.8
Col., Hock'g Vy. & Tol	320	320				2,626,731	2,195,587	431,146		19.6	8,209	6,861	1348		19.6
Denver & Rio Grande	1,095	775	320		41.3	5,981,760	5,563,396	418,364		7.5	5,463	7,179		1716	23.8
Des M. & Ft. Dodge	93	84	9		10.7	318,757	366,937			13.3	3,427	4,365		938	21.4
Det., Lan. & No	226	226				1,467,624	1,255,557	212,067	47,880	16.9	6,494	5,556	938		16.9
Eastern	284	283	1		1.3	3,102,828	2,939,107	223,721		7.6	11,139	10,386	752		7.5
Flint & Pere Marq.	345	318	27		8.5	1,950,709	1,706,326	244,433		14.3	5,654	5,366	288		5.7
Gulf, Col. & S. F.	373	245	128		52.2	1,387,466	920,118	467,348		50.8	3,717	3,755		38	1.0
Hannibal & St. Jo.	292	292				2,063,497	2,062,895	602		0.3	7,067	7,065	2		0.3
Houston, E. & W. Tex.	104	86	18		26.9	240,780	143,886	96,904		65.6	2,315	1,673	642		32.4
Ill. Cent., Ill. lines	919	918	1		0.1	6,371,775	6,150,870	220,905		3.6	6,933	6,700	233		3.5
Iowa lines	402	402				1,762,455	1,672,052	90,403		5.4	4,384	4,159	225		5.4
Ind., Bloom. & West.	619	555	64		11.5	2,436,451	2,294,947	141,504		6.2	3,936	4,135		199	4.8
Kan. City, Ft. St. & G.	344	310	34		11.0	1,583,115	1,394,463	188,652		13.5	4,602	4,498	104		2.3
Lake Erie & Western	386	386				1,357,552	1,268,455	84,097		6.6	3,504	3,280	218		6.6
Long Island	335	325	10		3.1	2,143,150	1,837,846	305,304		16.6	6,397	5,655	742		13.2
Louisville & Nashv.	2,025	1,857	168		9.0	11,759,479	10,190,583	1,559,896		15.3	5,803	5,488	315		5.7
Mar., Hought. & Ont.	90	88	2		2.3	1,184,724	884,519	300,205		33.9	13,164	10,051	3113		31.0
Mil., Lake Sh. & West.	287	252	35		14.0	809,567	558,383	251,184		44.8	2,821	2,216	605		26.6
Mo. Pacific lines:															
Central Branch	389	300	87		29.0	875,917	881,682		5,765	0.6	2,263	2,939		676	23.2
Int. & Gt. No.	775	625	150		24.0	2,941,719	2,481,940	459,773		18.5	3,796	3,971		175	4.4
Mo., Kan. & Tex.	1,232	931	301		32.4	5,755,687	4,939,437	816,250		16.5	4,672	5,306		634	11.9
Mo. Pacific	903	764	139		18.4	7,301,524	6,070,848	1,230,676		20.1	8,086	7,946	140		1.8
St. L., Iron Mt. & So.	751	685	66		9.6	6,800,330	6,628,164	172,166		2.6	9,055	9,676		621	6.4
Texas & Pacific	1,069	822	247		30.0	4,502,127	3,576,354	925,773		25.9	4,212	4,351		139	3.2
Mobile & Ohio	528	506	22		4.3	1,878,135	2,144,408		268,273	12.5	3,557	4,238		685	16.3
Nash., Chatta. & St. L.	348	348				1,746,695	1,902,131		155,436	8.2	5,019	5,466		447	8.2
N. Y. & New England.	399	331	68		20.6	3,127,713	2,569,879	557,234		21.8	7,837	7,764	73		0.9
Norfolk & Western	428	428				2,204,982	2,061,590	143,392		6.9	5,152	4,817	34		6.9
Northern Central	326	326				5,310,174	4,967,077	343,096		6.9	16,258	15,236	1023		6.9
Northern Pacific	1,190	802	388		48.5	6,466,682	3,720,499	2,745,583		73.8	5,600	4,637	963		20.9
Ohio Central	232	232				962,864	621,980	340,884		54.8	4,159	2,681	469		54.8
Pennsylvania†	1,947	1,902	45		2.4	44,922,667	40,392,434	4,530,233		11.2	23,073	21,237	1836		8.6
Peoria, Dec. & Evans.	254	233	21		9.1	707,874	627,562	80,312		12.8	2,787	2,693	94		3.5
Rich. & Danville	770	760	10		1.3	3,335,472	3,205,904	129,568		4.0	4,332	4,218	114		2.7
St. L., Alt. & T. H., Main Line	195	195				1,261,096	1,357,868		96,772	5.0	6,467	6,810		343	5.0
Belleville Line	121	121				797,746	681,832	115,914		17.0	6,59	5,635	958		17.0
St. L. & Cairo	146	146				344,403	386,267		40,804	10.6	2,368	2,646		280	10.6
St. L. & San Francisco.	660	620	40		6.5	3,243,787	2,872,331	371,056		12.9	4,914	4,633	281		6.1
St. P. & Duluth	175	175				1,015,062	657,083	357,979		54.5	5,800	3,755	2145		54.8
St. P., Minn. & Manitoba	978	791	187		23.6	8,011,255	4,350,697	3,660,558		84.1	8,191	5,500	2691		48.9
Scioto Valley	128	116	12		10.3	493,154	493,154	90,000		22.3	3,854	3,475	379		10.9
South Carolina	243	243				1,164,736	1,119,226	45,510		4.0	4,793	4,606	187		4.0
Tol., Cin. & St. L.	460	367	93		25.2	862,802	626,896	235,907		37.6	1,876	1,708	168		9.9
Union Pacific	3,740	3,443	287		8.3	27,652,171	25,443,302	508,869		1.9	7,494	7,977		483	6.1
Va. Midland	35	352				1,306,977	1,214,161	92,816		7.7	3,723	3,449	274		7.7
Wab., St. L. & Pac.	3,370	2,700	670		24.8	15,046,415	11,133,220	2,273,186		17.3	4,572	4,864		292	6.0
Wisconsin Central	472	472				1,370,908	1,036,268	234,640		32.3	2,904	2,195	709		32.3
Total, 63 roads	18,867	43,464	5,403			317,986,806	279,042,257	39,749,479	604,930		6.507	6,420	87		
Total inc. or dec.			5,403		12.4			38,944,549			14.0			87	1.4

SUPPLEMENTARY TABLE.

Metropolitan Elevated	18	18				2,485,192	2,294,529	190,663		8.2	139,036	127,474	10,592		8.3
N. Y. Elevated	14	14				3,054,277	2,664,575	389,702		14.3	218,163	190,327	27,836		14.3
Oregon Ry. & Nav. Co‖	2,021	1,884	137		7.3	4,679,600	4,029,894	649,706		16.1	2,315	2,139	176		8.2

* Not in table of earnings for November.
† Does not include branch or leased lines.
‡ Includes all lines east of Pittsburgh and Erie.
§ Railroad, 446 miles; river and ocean lines, 1,575 miles.

THE SCRAP HEAP.

Locomotive Building.

The Rhode Island Locomotive Works in Providence turned out 230 engines last year, and are still very busy, with orders enough to last for some time.

The Boston & Albany shops at Springfield, Mass., have just completed a heavy eight-wheel freight engine. The Boston shops have turned out a new passenger engine for use on the fast trains.

The Grant Locomotive Works in Paterson, N. J., are delivering an order of 23 engines to the Canada Southern road.

The Chicago & Northwestern shops in Chicago have begun to build 10 new eight-wheeled engines for the use of the road.

Car Notes.

The Michigan Car Co. in Detroit is building a number of box cars for the National Car Co., to run over the Central Vermont and Grand Trunk lines.

The Chicago & Northwestern shops in Chicago are building 20 new passenger cars for the road.

The Baugh Steam Forge in Detroit, Mich., is making 100 car axles a day, and also a large number of car links and pins.

The Pullman Car Works at Pullman have completed the first of a lot of very handsome new sleeping cars to run on the Atlantic Coast Line.

Bridge Notes.

The Pittsburgh Bridge Co. has recently added to its works in Pittsburgh, Pa., a building 32 by 130 ft. The shops are now running day and night on some heavy contracts, including the New York station for the East River Bridge and a number of railroad and highway bridges.

Rust & Coolidge, of Chicago, have lately completed some heavy bridge-work for the Atlantic & Pacific road in Arizona.

Iron Notes.

A meeting of blast furnace owners was held in Pittsburgh last week, at which there was a fair attendance. After a general discussion of the situation of the iron trade, it was decided to form a permanent association, and a committee was appointed to prepare a plan of organization, which will be submitted to an adjourned meeting in Pittsburgh, Jan. 11.

A difference of opinion exists in St. Louis as to wages, several of the mills desiring to make a reduction. The men are willing to accept some reduction, but hardly as much as is proposed.

The Oxford Iron Co., a new corporation, took possession Jan. 1 of the blast furnace and rolling mills at Oxford Furnace, N. J., which have been for some time in the hands of a receiver.

The Cleveland Rolling Mill Co. has closed its works in Cleveland, O., for the purpose of taking stock, making repairs, etc. They will start up in about two weeks.

The American Rolling Mill in Phillipsburg, N. J., started up Jan. 2, after stopping a week for repairs.

The new furnace of the Kirkland Iron Ore Co. in Kirkland, N. Y., went into blast for the first time on Jan. 1. It will run on local and Port Henry ores. Mr. Irvin A. Williams is General Manager of the company.

The Rail Market.

Steel Rails.—The year opens with the mills fairly busy, some of them with large orders ahead, while others claim to have but little work. The quotations continue at $40 per ton, but some large orders have been taken by Eastern mills at prices delivered in Chicago which will, it is said, net not more than $38 at mill. There seems to be no lack of orders at these prices.

Iron Rails.—Quotations are nominal and few transactions are heard of. With steel rails at $40 or even less, there can hardly be a large demand for iron rails at paying prices.

Time Tables.

Flaming advertisements and through time schedules abound in most of our stations, but of local time-tables,

which are needed most by nine passengers out of ten, there is too often a total lack. New York passenger stations are especially deficient in this matter. Not to find fault with any road in particular (for they are all alike, except the Pennsylvania), but merely to take an instance, on a recent trip into Connecticut the writer was unable to find, after a very careful search, any time-table of the Shore Line Division in the New York, New Haven & Hartford waiting rooms at the Grand Central Depot, while on the return trip, in a station of the Shore Line Division, he found a time-table of that division alone, with not a line or a figure to indicate what time or connections could be made beyond New Haven. And the agent knew no more than the time-table.

Taking the Names.

Some weeks ago the Rome, Watertown & Ogdensburg Co. issued an order to its conductors to take down and report the names and residences of all passengers paying their fare on the cars. The object of this is not quite clear, and it caused a good deal of excitement at first, many passengers resenting it as an unwarranted interference with their private affairs. The excitement has quieted down now, and people on the line of the road have become used to it, but many still continue to think it is an impertinence on the part of the company. Certainly the order cannot be enforced, if a passenger declines to give his name.

The American Automatic Freight Brake.

During the month of November inspections were made of 690 cars fitted with the automatic brake of the American Brake Co., in the St. Louis & San Francisco yards in St. Louis. The brakes on these cars had been in use for periods varying from one to 22 months. Of the whole number 49 needed repairs and new pieces, all the necessary work being done in the yard, and at small cost. Of those needing repairs 38 were of the horizontal and 11 of the upright pattern.

Fast Time.

The Chesapeake & Ohio has been making first-class time this winter, and yesterday the through express from the West made an exceptionally fast run. From Clifton Forge to Richmond, 197 miles, with two mountain grades, was made in 6 hours and 40 minutes, including all the stops. From Clifton Forge to Charlottesville the train consisted of six cars (all filled), including two heavy Pullmans, and from Charlottesville to this city the train was also quite heavy, including one Pullman.—*Richmond (Va.) State, Dec.* 23.

English Express Passenger Engines of To-Day and 20 Years Ago.

The "Lady of the Lake" is an express passenger engine designed, over 20 years ago, by Mr. John Ramsbottom, for express traffic on the London & Northwestern Railway, with 16-in. cylinders and 7½-ft. driving wheels, weighing 27 tons in working order, and with the tender 44½ tons. This engine, with an average train of eight or nine carriages, weighing about 73 to 75 tons, runs at a speed of 40 miles per hour, consuming 27 lbs. of coal per mile run. A four-coupled express engine of later design, for the same traffic, with 17-in. cylinders and 6½-ft. driving wheels, weighs about 29½ tons in working order. This engine can take, on a level, a gross load of 293 tons, including the weight of the engine and tender, at a speed of 45 miles per hour, with a working pressure of 120 lbs. per square inch on the boiler.—*The Engineer.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Indiana, Illinois & Iowa, annual meeting, at the office in Chicago, Jan. 17.

New York, Chicago & St. Louis, annual meeting, at the office in Cleveland, O., Jan. 30.

Philadelphia & Reading, annual meeting in Philadelphia, Jan. 8.

Philadelphia, Wilmington & Baltimore, annual meeting, in Wilmington, Del., Jan. 8.

Dividends.

Dividends have been declared as follows:

Boston, Revere Beach & Lynn, 3 per cent., semi-annual, payable Jan. 1. This company falls from 3½ to 3 per cent.

Cheshire, 1½ per cent., semi-annual, on preferred stock, payable Jan. 10.

Columbus, Hocking Valley & Toledo, 2½ per cent., payable Jan. 10. This is the first dividend of the consolidated company, although the Columbus & Hocking Valley paid 8 per cent. regularly for several years.

Connecticut River, 4 per cent., semi-annual, payable Jan. 1.

Housatonic, 2 per cent., quarterly, on the preferred stock, payable Jan. 15.

Portland, Saco & Portsmouth (leased to Eastern), 3 per cent., semi-annual, payable Jan. 15.

Providence & Worcester, 3 per cent., semi-annual, payable Jan. 1.

Foreclosure Sales.

The *Cleveland, Tuscarawas Valley & Wheeling* road will be sold Feb. 5 next, under the decree of foreclosure lately granted. The road-bed, right of way and real property will be sold as an entirety, and the personal property as an entirety, but separate from the real estate, the sales to be made subject to all the rights and liens created by a mortgage or deed of trust, to the Union Trust Co. of New York, dated on the first day of October, A. D. 1878, to secure seven hundred bonds of $1,000 each, and coupons attached, and any real estate in Lorain County, O., will be sold subject to any mortgage or mortgages for the purchase money or otherwise, and subject also to all taxes and assessments thereon for public purposes. And certain locomotives and cars under contracts of lease, or conditional sale, will be sold subject to the conditions of the contracts.

The railroad and real property was appraised, subject to the mortgage or deed of trust to the Union Trust Co., at $4,325,188.72, and the personal property was appraised subject to the contracts of the lease or continual sale at $553,561.28.

The terms of sale are cash in hand, or the bonds or overdue coupons secured by the deeds of trust or mortgages to the Union Trust Co. of New York, made in the years 1871 and 1877, and a mortgage or trust deed made to W. S. Streator, in the year 1872, the bonds and coupons to be applied upon the purchase price of the property, according to the order of Court.

American Institute of Mining Engineers.

The Annual Meeting of the Institute will be held in Boston, beginning Tuesday, Feb. 20, 1883. A subsequent notice will give the detailed programme of the meeting. Members are requested to give early information to the Secretary of their intention to read papers at this meeting.

The Secretary also wishes to notify members that Vol. X, *Transactions*, will be distributed this month. "Members are reminded of the fact that the annual volumes are not sent to those in arrears for dues for the current year. The volume will be issued, as usual, in paper covers, but members can have it delivered to them bound in half-morocco, uniform with the previous volumes of the series, for $1. This payment should be made at once to the Secretary."

Master Car-Builders' Club

A business and social meeting of the Club will be held at the rooms, No. 113 Liberty street, New York, on Thursday, Jan. 18, 1883, at 8 o'clock p. m.

Subject for discussion—"Car wheels and gauges for seating wheels on axles—rail sections and track gauges."

Road-masters and civil engineers are especially invited to attend.

ELECTIONS AND APPOINTMENTS.

American Society of Civil Engineers.—At the meeting of Dec. 6 the following candidates were chosen members: Timothy E. Bradley, St. Joseph, Mo.; Henry J. Gislow, Town Creek, Ala.; Edward S. Safford, Newburg, N. Y.; Thomas W. Spencer, Utica, N. Y.; Russell Thayer, Philadelphia; Edmund B. Weston, Providence, R. I.; James D. Schuyler, Culiacan, Mexico.

Boston & Albany.—Mr. Arthur S. Hanson has been appointed Chief Clerk of the General Passenger Department.

Boston, Hoosac Tunnel & Western.—Taking effect Jan. 1, 1883, Alfred Gorham is announced as Auditor and Assistant Treasurer of this company, with office at Saratoga Springs, N. Y. All remittances, drafts and accounts will be addressed to him after that date.

Boston & Lowell.—At the annual meeting in Boston, Jan. 3, the old board was re-elected, as follows: Josiah G. Abbott, Thomas Talbot, Wm. A. Burke, Edwin Morey, F. Jefferson Coolidge, Frederick E. Clarke, Channing Clapp. An opposition ticket received but few votes.

Boston & Maine.—Mr. George J. Fisher has been appointed Purchasing Agent, with office in Boston. He was recently with the Eastern road.

Buffalo & Pine Creek.—This company has elected the following: President, John P. Manchester, Hume, N. Y.; Vice-President, G. H. Blackman, Belmont, N. Y.; Secretary, G. S. Van Gorder, Pike, N. Y.; Treasurer, Charles Stebbins.

Canadian Pacific.—Mr. Donald A. Smith has been chosen a director in place of J. J. Hill, resigned.

Central, of Georgia.—At the annual meeting in Savannah, Jan. 1, the following were chosen: President, W. G. Raoul; directors, Andrew Low, Edward C. Anderson, J. Gresham, George Cornwell, Jacob Rauers, E. H. Green, H. M. Comer, Abram Minis, William Hunter, John M. Guerard, George J. Mills, W. W. Gordon.

This was the Savannah ticket and defeated by a majority of 4,211 votes an opposition ticket headed by Gen. E. B. Alexander in the Louisville & Nashville interest.

Cincinnati & Eastern.—Mr. W. L. King has been appointed Road-Master, with office in Cincinnati. Mr. J. G. Bates will be Assistant to Mr. King.

Cincinnati, Indianapolis, St. Louis & Chicago.—Mr. J. M. Johnson, Assistant General Freight Agent, goes to Chicago, and will continue in his present capacity, with headquarters in that place. Mr. C. M. Hobbs, Local Agent at Indianapolis, has been promoted to the position of Assistant General Freight Agent. His headquarters will not be changed.

Cleveland & Pittsburgh.—At the annual meeting in Cleveland, O., Jan. 3, the following directors were chosen: J. N. McCullough, B. F. Jones, George B. Roberts, Wm. Bucknell, Frederick Sturges, Samuel J. Tilden, Charles Lanier, Wm. C. Eggleston, O. A. Ferguson, J. V. Painter, James F. Clark, R. P. Ranney.

Danbury & Norwalk.—Mr. C. W. Rogers has been appointed General Freight Agent.

Eastern.—The board has elected Payson Tucker General Manager, a new office. Mr. Tucker has been for some years General Superintendent of the Maine Central.

Mr. G. F. Hurd is appointed Purchasing Agent in place of G. J. Fisher, who has gone to the Boston & Maine.

Fall Brook Coal Co.—At a meeting of the board of managers of this company, the following officers were duly elected: John Lang, Vice-President; Daniel Beach, General Counsel; John H. Lang, Assistant Treasurer; A. H. Gorton, General Superintendent; Geo. R. Brown and W. E. A. Gorton, Assistant Superintendents.

Mr William Nicholson was appointed Auditor of this company, to take effect Jan. 1.

The company leases and works the Syracuse, Geneva & Corning, the Corning, Cowanesque & Antrim and the Jersey Shore, Pine Creek & Buffalo roads.

Georgia Pacific.—At the annual meeting in Birmingham, Ala., Dec. 16, the following were chosen: John B. Gordon, President; John W. Johnston, Vice-President; T. M. Logan, W. P. Clyde, A. C. Haskell, R. H. Temple, B. Peyton, L. D. Aylett and E. M. Tutwiler, directors. A. B. Johnston was elected Secretary and Auditor; R. H. Temple, Chief Engineer; W. R. Trigg, Treasurer; H. C. Ansley, Assistant Treasurer; J. Y. Sage, Superintendent First Division; S. H. Hurcell, Superintendent Third Division.

Hartford & Connecticut Western.—The board has elected Wm. L. Gilbert President; C. T. Hillyer, Vice-President; E. R. Beardsley, Secretary and Treasurer; J. F. Jones, Superintendent and General Freight Agent.

Illinois & St. Louis.—Mr. Thomas McKissock has been appointed General Manager. He served formerly on the Iron Mountain and the St. Louis, Kansas City & Northern roads.

Little Falls, Dolgeville & Piseco Lake.—At a recent meeting the following officers were elected: President, George A. Hardin; First Vice-President, Zenas C. Priest; Second Vice-President, S. M. Richmond; Secretary, Watts T. Loomis; Treasurer, Rodney S. Whitman.

Littleton & Franconia.—The officers of this new company are: President, Cyrus Eastman, Littleton, N. H.; Clerk, E. C. Stevens; Treasurer, Henry L. Tilton.

Louisville & Nashville.—Mr. Milton H. Smith is appointed General Manager of all lines operated by this company, vice Mr. F. de Funiak, resigned.

Mr. F. W. Vaughan is appointed Consulting Engineer of this company, office corner of Main and Second streets, Louisville.

Marietta & Cincinnati.—Mr. J. H. Stewart, Receiver and formerly General Superintendent, has been appointed General Manager for the purchasers of the road.

Michigan Central.—The following appointments have been made by General Manager H. B. Ledyard, taking effect Jan. 1:

E. C. Brown, General Superintendent of the line west of Detroit River. Office, Detroit, Mich.

W. P. Taylor, General Superintendent of the line east of Detroit River, including the Michigan, Midland & Canada Railroad. Office, Buffalo, N. Y.

Wm. H. Perry, General Eastern Freight Agent, in charge of the local traffic of the Canada Southern Railway, with such other duties as may be assigned to him by the General Freight Agent. Office, Buffalo, N. Y.

W. H. Hurlburt, Eastern Passenger Agent. Office, Buffalo, N. Y.

L. J. Pelton, Assistant Auditor and Assistant Cashier. Office, St. Thomas, Ont.

A. F. Howland, Assistant to the Purchasing Agent. Office, St. Thomas, Ont.

Morgan's Louisiana & Texas.—Mr. J. George Shreven has been elected Vice-President and General Traffic Manager, with office in New Orleans.

New York, New Haven & Hartford.—Mr. O. M. Shepard is appointed Superintendent of the Air Line Division, from New Haven to Willimantic. He was recently with the New York & New England.

Northern Central.—The following circular is dated Jan. 1, 1883:

"Mr. Geo. C. Wilkins has been appointed General Agent at Baltimore, and will (in addition to the duties of General Superintendent of the Baltimore & Potomac Railroad) perform the following duties:

"He shall keep himself in communication with the agents of connecting roads, to enable him to secure all necessary information as to the probable demands for transportation, and shall report such information to the proper officer, with such suggestions as he may think will promote the interests of the company. He shall also keep himself advised upon commercial and other questions affecting the interests of the company at that point, and report to the proper officer thereon. He shall have the general supervision of the freight and passenger stations at Baltimore, and shall see that the business thereat is properly and systematically managed, that the agents in direct charge keep their books and accounts in the manner prescribed by the regulations of the company, and that their bills are promptly made out and collected. He shall attend to such other duties as the President, Vice-President or General Manager may from time to time assign to him."

Mr. Wilkins' authority as General Agent also extends over the Philadelphia, Wilmington & Baltimore, the Baltimore & Potomac and the Union railroads.

Northern Pacific.—The following circular is dated Dec. 1:

"Mr. W. T. Small is appointed Assistant to the Superintendent of Motive Power, Machinery and Rolling Stock, and as such will act with the title of 'Assistant Superintendent Machinery,' Western Divisions. Mr. Small will, in the absence of the Superintendent of Motive Power, Machinery and Rolling Stock, have control of all matters in Machinery Department, as above.

"In addition to authority conferred by above circular, Mr. W. T. Small will, with the same title and authority, act for the Construction Department, Northern Pacific Railroad Co., on all lines under construction, Western Division."

San Pete Valley.—Mr. F. C. Hand has been appointed Superintendent in place of F. S. Cahill, resigned. Office at Wales, Utah.

Sauk Centre Southern.—The officers are: President, J. V. Brower; Vice-President, Alexander Moore; Secretary, Henry Keller; Treasurer, G. M. Bennett; Chief Engineer, W. R. Gillis. Office in Sauk Centre, Minn.

Terre Haute & Indianapolis.—At the annual meeting in Terre Haute, Ind., Jan. 1, the following directors were elected: William R. McKeen, Alexander McGregor, Josephus Collett, D. W. Minshall, Henry Ross, J. C. Crawford and George E. Farrington. The new board met and elected the following officers: President, W. R. McKeen; Secretary, George E. Farrington; Treasurer, J. W. Cruft.

Texas & St. Louis.—Mr. Geo. W. Ristine has been appointed General Manager of this company, with office at St. Louis. To take effect Jan. 1, 1883.

Toledo, Cincinnati & St. Louis.—At a meeting held in Boston, Dec. 30, the board elected John Felt Osgood and E. B. Phillips directors in place of W. D. Forbes and George Ripley, resigned. The board then elected E. B. Phillips President.

Virginia Midland.—At the annual meeting in Alexandria Va., Dec. 21, the following were chosen: President, John, S. Barbour; directors, T. M. Logan, John McAnerney, John E. Hurst, W. H. Payne, W. Bayard Brown, Wm. S. Young, Robert Garrett, Lewis N. Hopkins, Robert T. Baldwin, Geo. Parsons, C. J. Osborne, John T. Lovell, Samuel Spencer, Jas. Sloan, Jr., Wm. F. Frick, John R. Bland.

Wabash, St. Louis & Pacific.—Mr. J. C. Gault, Second Vice-President, has issued the following circular: "Mr. A. C. Bird having resigned his position as General Freight Agent of this company, to take effect Jan. 1, 1883, Mr. M. Knight has been promoted to fill the vacancy, and will assume the duties of the position on that date. Mr. C. L. Wellington has been promoted to the position of First Assistant General Freight Agent and Mr. E. S. Macken has been appointed Second Assistant General Freight Agent."

PERSONAL.

—Mr. E. A. Lister has resigned his position as Superintendent of the Camden & Atlantic Railroad to accept a similar position in Mexico.

—Mr. W. H. Coffin, Land Commissioner of the St. Louis & San Francisco road, died Dec. 25, at the residence of his daughter in Bluffdale, Ill., after a long illness.

—Mr. John Waddle died last week in Chillicothe, O. He was formerly Chief Engineer of the Marietta & Cincinnati, had been for many years a director and lately President of the company.

—It is reported that Mr. Charles J. Brydges, formerly of the Great Western and the Grand Trunk, has been offered the position of General Manager of the Canadian Pacific. Should he accept, it is said that Mr. W. C. Van Horne will remain with the company in charge of all new construction.

—Mr. W. R. Morley, Chief Engineer of the Mexican Central Railway, is reported by a telegram from Chihuahua, Mexico, to have been accidentally shot and killed at Santa Rosalia, Mexico, on Jan. 3. Mr. Morley was a member of the American Society of Civil Engineers, and has been engaged on roads west of the Mississippi during most of his professional life. He became well known as Engineer of the Leadville Branch of the Atchison, Topeka & Santa Fe Railroad during what was known as the "Cañon war." He had, previous to his appointment on the Mexican Central, just

completed the Sonora Railroad. He had given special attention to the subject of compensating for curves on grades, and used his system in the location of the Sonora road it is said with great success in eliminating friction on such curves.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1882.	1881.	Inc. or Dec.		P.c.
Year ending Dec. 31:					
Atch , Top. & S. F.	$14,865,354	$12,584,509	I.	$2,288,845	18.1
Net earnings	6,166,594	4,546,682	I.	1,619,912	35.6
Chi., Bur. & Quincy	21,200,000	21,324,150	D.	124,150	0.6
Net earnings	10,057,000	10,257,635	D.	200,635	1.9
Denver & R. G.	6,349,858	5,980,488	I.	369,370	6.2
Mobile & Ohio	2,183,778	2,403,219	D.	219,441	9.1
Eleven months ending Nov. 30:					
Marquette, H. & O.	$1,174,426	.....		.....	....
Net earnings	652,321	.....		.....	....
Norfolk & Western.	2,204,982	$2,061,590	I.	$143,392	6 9
Net earnings	1,005,981	1,008,867	D.	2,886	0.3
Wabash, St. L. & P.	15,406,405	13,173,132	I.	2,233,273	17.0
Net earnings	4.785,190	3,471,017	I.	1,314.173	37.9
Month of October:					
N.Y., Lake E. & W.	$1,819,610	$1,814,866	I.	$4.144	0.2
Net earnings	643,329	625,679	I.	17,650	2.8
Month of November:					
Norfolk & Western.	$261,235	$228,995	I.	$32,240	14.0
Net earnings	128,360	120,734	I.	7,626	6.3
Month of December:					
Denver & R. G.	$443.000	$626.728	D.	183,728	29.3
Mobile & Ohio	307,643	258,811	I.	48,832	18.9
Third week in December:					
Ches. & Ohio	$66,250	$41,832	I.	$24,418	58.1
Chi. & Eastern Ill.	39,009	36,811	I.	2,198	5.9
Chi. & Gd. Trunk	59.050	33,946	I.	25,104	73.8

Grain Movement.

For the week ending Dec. 23 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and receipts at the seven Atlantic ports have been, in bushels, for the past nine years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874	2,147,360	799,017	1,464,357
1875	2,093,025	958,855	1,630,724
1876	2,452,664	964,795	1,882,838
1877	1,528,048	1,099,339	3,561,847
1878	2,548,745	1,149,265	2,569,146
1879	3,885,013	918,954	3,086,259
1880	3,682,228	1,677.592	2,850,614
1881	3,515,916	1,795,643	1,922,472
1882	4,586,228	1,894,237	2,480,221

The receipts of the Northwestern markets for the week were thus 30 per cent. more than in the corresponding week of last year, and larger than in any other corresponding week. They were nearly the same as in the week before. The shipments of these markets were also larger than in the corresponding week of any previous year, and about the same as the week before. Only 9,767 bushels went down the Mississippi this week. The Atlantic receipts were 30 per cent. more than last year, but smaller than in any other year since 1876.

Of the Northwestern receipts for the week Chicago had 44.5 per cent., St. Louis 19.3, Milwaukee 12, Peoria 9.2, Detroit 6.2, Toledo 5.6, Duluth 1.7, and Cleveland 1.5 per cent. Compared with the previous week Chicago loses and St. Louis and Peoria gain. Corn is again the leading grain received—43 per cent. of the whole. Nearly two-thirds of it went to Chicago, one-fifth to St. Louis and one-eleventh to Peoria. The flour receipts, however, not considered here, together with the wheat, exceed the corn receipts still, and three-fourths of these are at Chicago and Milwaukee. In no previous year have the corn receipts been so large at this season. Though there has been a great increase of the corn "in sight" (in store at the several markets) within the past month, the quantity is still not half as great as at this time in 1880 and 1881, which makes it probable that the heavy corn movement will continue through January at least.

Of the Atlantic receipts for the week New York had 40.6 per cent., Baltimore 21.3, Boston 14.8, Philadelphia 13, New Orleans 7.2, Portland 2.6, and Montreal 0.5 per cent. The receipts at New York were 21 per cent. less than the week before, but at the other places except Baltimore there was some increase. With one exception the New York receipts were the smallest since April, but this is usually a season of small seaboard receipts.

Of the 1,445,552 bushels of grain exported from these ports in this week, 40.4 per cent. went from New York, 26.3 from Baltimore, 17.5 from New Orleans, 7.9 from Philadelphia, 5.1 from Portland, and 2.8 from Boston. Of the 224,983 barrels of flour exported 63.7 per cent. went from New York, 21.2 from Boston, 10 from Baltimore, 4 from Philadelphia, 0.8 from New Orleans, and 0.3 from Boston.

Exports from Atlantic ports for the week to Dec. 27, for three years have been:

	1880.	1881.	1882.
Flour, bbls	157,060	66,129	180,368
Grain, bu	2,611,377	1,405,955	1,219,712
Flour and grain, bu	3,318,147	1,703,535	2.031,368

For the eight weeks ending Dec. 27, exports have been:

	1880.	1881.	1882.
Flour, bbls	1,068,846	450.919	1,309,182
Wheat, bu	14,962,936	7,009,982	8,959,481
Corn bu	10,987,093	5,390,786	1,642,447
Other grain, bu	1,258,172	907,106	912,807
Flour and grain, bu	32,018,008	15,935,009	17,406,054

For the week the total exports were 20 per cent. more than last year, but 40 per cent. less than in 1880. For the eight weeks the exports were 10 per cent. more than in 1881, and 46 per cent. less than in 1880. The corn exports were no less than 70 per cent. less than in 1881, and 85 per cent. less than in 1880. Notwithstanding this the corn exports were much larger in these eight weeks than for a long time before. Indeed, the exports hardly began till December, as 1,344,607 bushels of the corn exports were in the last four weeks, against 2,878,047 bushels from the whole United States (including considerable from lake ports to Canada) in the five months previous, and 297,840 bushels from these ports in the four weeks previous.

For the week ending Dec. 30, receipts and shipments at Chicago and Milwaukee were.

	Receipts.		Shipments.	
	1882.	1881.	1882.	1881.
Chicago	3.370,228	1,202,288	1,630,019	988,263
Milwaukee	643,175	636,054	218,395	295,736
Both	4,013,403	1,838,342	1,848,414	1,283,999

The receipts were thus more than twice as great as last year, and were, indeed, very large for any year in the winter. Last winter in January and February, when shipments were extraordinarily large from these places, the receipts never reached 3,100,000 bushels in any one week, and they averaged but 2,325,000 bushels a week in December, 2,421,000 in January, and 1,735,000 in February.

The shipments were not half as great as the receipts, but were nearly one-half more than last year. The receipts and shipments of flour for the week were at both places:

	1882.	1881.	Increase.	P. c.
Receipts	260,395	185,093	75 302	40.7
Shipments	243,498	182,478	61,020	33.4

For the week ending Dec. 30 receipts at four Eastern ports have been:

Bushels:	New York.	Boston.	Phila.	Baltimore.	Total.
1882	1,261,704	473,019	330,100	727,898	2,792,721
1881	686,567	302,349	168,400	363 974	1,521,290
1880	1,374,292	565,222	448,300	687,073	3,074,887
P. c. of total:					
1882	45.2	17.0	11.8	26.0	100.0
1881	45.1	19.9	11.1	23.9	100.0
1880	44 7	18.4	14.6	22.3	100.0

Philadelphia and Baltimore together received 37.8 per cent. of the whole in 1882, against 35 per cent. in 1881 and 36.9 in 1880. Of the flour receipts for the same week, 66.4 per cent. came to New York, 24 7 to Boston, 5.1 to Philadelphia, and 3.8 to Baltimore. The flour receipts (312,461 barrels) were equivalent to 1,406,074 bushels of wheat—nearly twice as much as the total wheat receipts.

Coal Movement.

Coal tonnages for the week ending Dec. 23 are reported as follows:

	1882.	1881.	Inc. or Dec.		P.c.
Anthracite	607,628	594,845	I.	12,783	2.1
Semi-bituminous	105,300	95,153	I.	10 147	10,7
Bituminous, Pa	71,580	60,783	I.	10,797	17.7
Coke, Pa	66.433	49,595	I.	16,838	33.7

The coal tonnage of the Pennsylvania Railroad for the week ending Dec. 23 was: Coal, 190,483; coke, 66,433; total, 256,916 tons. The total this year to Dec. 23 was 10,902,606 tons.

Cumberland shipments for the week ending Dec. 23 were 41,999 tons. The total this year to Dec. 23 was 1,471,151 tons.

A charter has been granted in Pennsylvania to the Clearfield Bituminous Coal Co. The capital stock is placed at $5,000,000. Among the incorporators are William H. Vanderbilt, G. J. Magee, Cornelius Vanderbilt, William A. Wallace, S. R. Peale and James Tillinghast. The object of the new corporation is to mine and sell coal, iron ore, fire clay and other minerals, and to manufacture and sell coke made from bituminous coal. The principal office will be at Clearfield, Pa., and the business will be transacted in Clearfield and Centre counties. The outlet north and east for the business of the new corporation, it is stated, will be through the Susquehanna & Southwestern Railroad, a charter for which was granted last August, and of which William A. Wallace is President. This railroad corporation has a capital of $4,000,000, and its lines will pass through Lycoming, Clinton, Centre and Clearfield counties, portions of the state that have never been practically developed. The Reading system from New York and Philadelphia will give transportation to the east, while the Jersey Shore, Pine Creek & Buffalo road will supply an outlet to Buffalo and the great lakes.

Pacific Emigrant Business.

At a meeting of the Chicago and St. Louis lines, held in Chicago, Dec. 29, at Commissioner W. H. Dixon's office, the following telegram was ordered sent to Mr. T. H. Goodman, General Ticket Agent of the Central Pacific:

"It being evident to all that the lines west of the Missouri River have a larger financial interest in the emigrant business between the San Francisco and the Eastern seaboard points than have the lines between the Missouri River and Chicago & St. Louis, and it being manifestly unjust that such lines should be asked to accept the differences between the arbitraries established on such business east of Chicago and St. Louis and that of the Missouri River and the through rates proposed for adoption, therefore, *Resolved*, That we notify the lines interested that we will accept no such business, nothing less than the proportion heretofore accepted until it can be shown that a less through rate than such proportions would make is necessary, in which case we will accept a *pro rata* per mile of such through rate on the proportion accruing between San Francisco and Chicago and St. Louis. It being understood that such *pro rata* shall not in any event increase our proportion beyond that now accepted."

This telegram was signed by Messrs. F. Chandler, James Charlton, E. St. John, W. A. Thrall, P. Lowell, H. C. Townsend, A. V. H. Carpenter, and S. K. Hooper.

Steamship Passes.

At a meeting of the Western Trunk Lines Passenger Association in Chicago, Dec. 29, there were present: Messrs. J. Charlton, F. Chandler, H. C. Townsend, W. H. Thrall, P. Lowell, A. V. H. Carpenter, S. K. Hooper, and A. H. Hanson.

The following resolution was adopted:

"*Resolved*, That during the year 1883 the lines in this association may give to each ocean steamship company one personal, not transferable, annual pass, and that no passes or free transportation be granted to any steamship company or on account of any steamship company, beyond the one above specified."

OLD AND NEW ROADS.

Atlantic & Pacific.—The extension of the Western Division of this road was delayed from Jan. 1 to July 1 of this year, on account of the Cañon Diablo Bridge. This structure is of iron, 541 ft. long and 222 ft. high; it weighs 837,130 lbs. without the ties and rails, and is supported by 1,489 cubic yds. of first-class cut stone masonry resting upon the solid limestone rock through which the Cañon has been formed.

Tracklaying was commenced on July 1, and during that month there was laid 33.56 miles of main line, 0.93 side track, 0.32 miles of Y and 0.15 miles of freight spur. In August there was laid 32.76 miles of main line, 0.60 miles of side track, 0.10 miles of freight spur, and 0.28 miles of Y-track. In September laid 17.40 miles of main line, 2 miles side track. In October laid 22.50 miles of main line, 1.21 miles side track. In November laid 10.55 miles of main line, 0.30 miles of side track. In December laid 22 miles of main line and 0.90 miles of side track.

During the year the road has been extended from Cañon Diablo to Yampai station, a distance of 138.77 miles. The distance from Albuquerque to Yampai is 451.3 miles.

Since July 1, tracklaying has been delayed somewhat by several iron bridges: P. dre, 230 ft. long, 90 ft. deep, built by the Central Bridge Co., of Buffalo, N. Y.; two in Johnson Cañon, 330 and 360 ft. long respectively, crossing cañons about 80 ft. deep, erected by C. Shaler Smith, and Chino Bridge, 600 ft. long, 65 ft. high, built by Rust & Coolidge, of Chicago.

There are no more iron bridges to cross until the Colorado River is reached, and tracklaying will be continued without much delay, reaching that point some time in March, when connection will be made with the Mohave Branch of the Southern Pacific.

Augusta & Knoxville.—This company made default on the January coupons on its first-mortgage bonds, of which about $630,000 are outstanding. A meeting of the stockholders has been called to consider some plan for providing money to pay the interest.

The road is in operation from Augusta, Ga., to Greenwood, S. C., 70 miles, most of it having been built last year. A further extension has been begun.

Baltimore & Ohio.—A dispatch from Columbus, O., Dec. 30, says: "The old fight between the Baltimore & Ohio and Pan Handle railways over 33 miles of joint track between this city and Newark was renewed to-day by the former company making an affidavit that the injunction of last August had been violated by the latter road in refusing to pay their proportion of salaries, and in interfering with the management of the road and trains. The Court issued an order returnable Jan. 8 to show cause for the procedure, and why they should not be held in contempt."

The passenger erecting shop at this company's works at Mount Clare, Baltimore, caught fire on the night of Jan. 3, and was destroyed, with eight new passenger cars and three old ones under repair. The loss is estimated at $40,000. The fire was prevented from spreading to the other shops.

Batesville & Brinkley.—Track on this road is now laid from Brinkley, Ark., northward to Colona, 25 miles, and trains are running. The extension will not be completed to Batesville for some time yet. The road is a reorganization and extension of the old Cotton Plant road, built from Brinkley to Cotton Plant, 11 miles, several years ago.

Boston & Maine and the Eastern.—The committees of the directors of these companies held a conference in Boston last week in relation to the lease of the Eastern road. No result was reached, but another conference is to be held.

Bridgeton & Saco River.—Track is reported all laid on this road, and it will be opened for business in a few days. It is 16 miles long, from Hiram Junction, Me., on the Portland & Ogdensburg road, to Bridgeton. It is of 2 ft. gauge and is laid with 30-lb. steel rails. The equipment is similar to that built for the Billerica & Bedford road, and now in use on the Sandy River road.

Bufialo Pit tsburgh & Western.—The long pending suit of the Pennsylvania Transportation Co. to enforce against the property of this company a judgment obtained against the Oil Creek & Allegheny River Co. some years ago, has finally been decided in favor of the Buffalo, Pittsburgh & Western Co., the Court holding it not liable for the claim.

Central, of Georgia.—The annual election of this company on Jan. 1 resulted in the election of the ticket headed by W. G. Raoul by a majority of 4,211 votes over that headed by E. P. Alexander. There were 66,379 votes cast, out of a total of 75,000. This is a defeat of the Louisville & Nashville interest by the friends of the late President Wadley and his policy. The contest has been a lively one, and the result was in doubt until the day of the meeting. It was generally supposed to depend largely upon the way in which the stock owned by the estate of the late Moses Taylor was voted.

Central Vermont.—It is said that very nearly a majority of the bonds of the Vermont Central and of the stock of the Vermont & Canada has been deposited with the American Loan & Trust Co. in Boston, in pursuance of the plan of reorganization. The time for depositing stock and bonds has been extended from Dec. 31 to Jan. 31 by the trustees.

Chicago, Milwaukee & St. Paul.—The Cannon Valley Branch is now completed to the Mississippi at Red Wing, Minn., 20 miles eastward from the late terminus at Cannon Falls, and 25 miles from the starting point at Northfield. Regular trains will be put on this week.

The branch of the new Chippewa Valley Division from Menominie, Wis., to Cedar Falls, 6 miles, is also completed and will soon be opened for business.

Cincinnati, New Orleans & Texas Pacific.—The Cincinnati *Commercial* says: "This company (lessee of the Cincinnati Southern) has made another application for the release of $200,000 of the bonds deposited to secure betterments. At their meeting on Saturday the Trustees acted favorably upon the request, and appointed Mr. W. A. Gunn to verify the report of Chief Engineer Bouscaren as to betterments actually made. This is all in accordance with the terms of the lease as understood by the Trustees of the railway and of the sinking fund, and the bonds will, undoubtedly, be released. This will make $400,000 of the $500,000 deposit withdrawn, and represents $400,000 or more spent on permanent improvements of the road by the present lessees."

Danville & New River.—This company has let the contract for the extension of the road from Martinsville, Va., to Patrick Court House, to A. B. Fortune of Asheville, N. C., work to be begun at once. The distance is 32 miles. The company is to furnish the rails.

Galveston, Houston & Henderson.—This company has been finally reorganized by the purchasers at the foreclosure sale, and an agreement has been made for the lease of the road to the International & Great Northern Co. There will be an issue of $2,000,000 new 5 per cent. bonds, to be guaranteed by the lessee. The issue is to be used for improvements, but in amount it is sufficient to build an entirely new road.

Hartford & Harlem.—This is the name of a new company organized under the Connecticut general law to build a railroad from Hartford, Conn., to the New York line in Greenwich, whence a New York organization is to continue the line to the Harlem River. The route as laid down is generally parallel to the New Haven road, but does not pass through New Haven, the intention being to reach that city by a spur or by the use of the New Haven & Derby road. The incorporator's names are not those connected with the old familiar "Parallel Road" project, organized yearly to be bought off, but are new men. From the fact that the list includes one or two of the firm of Lee, Higginson & Co., of Boston, it is conjectured that this is a New York & New England project.

Indianapolis & Evansville.—Track on this road is now laid from the junction with the Ohio & Mississippi at Washington, Ind., southward to Pittsburgh, 16 miles. Regular trains will be run in a few days.

Jersey Shore, Pine Creek & Buffalo.—Track on this road is now laid for 15 miles northward from Williamsport, Pa., and for 25 miles southward from Stokesdale, the connection with the Corning, Cowanesque & Antrim road. This makes 40 miles of track now laid in all.

Lehigh & Eastern.—This old project is revived by the organization of a construction company for the purpose of building the road. The line as projected is from Tomhicken, Pa., to the Delaware River and up that river to Port Jervis, N. Y. Work has been begun on the road a number of times, but very little has actually been done.

Little Rock & Fort Smith.—A dispatch from Little Rock, Ark., Dec. 30, says: "In 1868 the Arkansas Legislature passed an act loaning the state bond to railroad compa-

nies to the extent of $10,000,000. Bonds to various railroads were issued for nearly $6,000,000. Subsequently the State Supreme Court decided that the act had not been legally passed. Several months ago W. T. Tompkins, a holder of bonds issued by the Little Rock & Fort Smith Co. filed a bill in the United States Circuit Court at Little Rock to compel that company to pay the state bonds and to foreclose the state lien on the railroad. The company filed a demurrer. The Circuit Court, in an opinion written by Judge Caldwell, of the United States District Court, and concurred in by Judge McCrary, of the United States Circuit Court, has overruled the demurrer, holding that the lien in favor of the state to secure the payment of the state bonds loaned to the original company is paramount to the lien created by the subsequent mortgage, under which the defendant claims, and that the holders of the state bonds are entitled to be subrogated to the lien of the state to secure their payment. The Court further holds that the decision of the Supreme Court of the state that state bonds are not binding obligations of the state, in nowise affects the rights of the bondholders against the company, or the validity of the statutory lien to secure their payment. The bonds affected by this decision represent nearly one-half of the disputed debt of the state."

Manhattan.—At a meeting of the Executive Committee held Dec. 30, 1882, the following preamble and resolutions were unanimously adopted:

"*Whereas*, Since the publication of the notice by this company of the payment on Jan. 2, 1883, of interest on the bonds of the Metropolitan Elevated Railway Co., and of a dividend on the first and second preferred stocks of the Manhattan Railway Co., an action was last evening commenced against this company and the New York Elevated Railroad Co. by the Metropolitan Elevated Co. and its President, Mr. Sylvester H. Kneeland, charging among other things that the lease of May 20, 1879, was invalid and that this company never had, and has not now, a legal existence, and an injunction has been issued therein against the payment of such dividends; and

"*Whereas*, Under the said lease this company has paid to and for the Metropolitan Elevated Co. several hundred thousand dollars in excess of the earnings which it has received from the railways of that company (the excess being paid out of the earnings of the New York Elevated Railroad Co.) and leaving a large balance due to this company from the Metropolitan Elevated Railway Co. if the said lease were held invalid; therefore.

"*Resolved*, That until the validity of the said lease is determined this company will pay no rental to the Metropolitan Elevated Railway Co., nor any interest on the bonds of the said Metropolitan Elevated Railway Co.

"*Resolved, further*, That the counsel of this company be requested to take immediate steps for the judicial determination of the said questions at the earliest possible moment."

Notwithstanding this notice the Manhattan Co. paid the January coupons on Metropolitan bonds. It is said that the payment was made by advice of the Court.

Marietta & Cincinnati.—It is stated that the new company to be organized by the purchasers at the foreclosure sale will be called the Cincinnati, Washington & Baltimore. The new company will be organized as soon as possible.

New York, Lake Erie & Western.—This company has resumed the publication of its earnings monthly. The statement for October, the first month of the fiscal year, is as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Earnings	$1,819 010	$1,814,866	I. $4,144	0.2
Expenses	1,175,681	1,189,188	D. 13,507	6 0
Net earnings	$643,329	$625,678	I. $17,651	2.8

The United States Circuit Court in New York has given an opinion in the suit of T. Nichols and others against this company. The action is brought with a view of determining the net profits of the year 1880, so that the dividends, which are claimed to be due to the holders of preferred stock, be paid. The Court orders a decree to be entered according to the prayer of the orators in the bill of complaint, which is that "the holders of said preferred stock are entitled to dividends at the rate of 6 per cent. per annum in every year that the net profits of the year, as declared by the board of directors of said company, are sufficient to pay the same, or so far as the said net profits, as so declared, will suffice therefor, and that the net profits of said year, ending Dec. 30, 1880, may be ascertained, and the dividends due to the holders of said preferred stock, in respect thereof, directed to be paid."

The case is not likely to be finally decided for some time to come, as an appeal will probably be taken.

New York, New Haven & Hartford.—Surveys and plans have been completed for the two additional tracks between Stamford and the junction of the Harlem River Branch at New Rochelle. The new line will avoid many of the curves in the present road, and the maximum grade will be 30 ft. to the mile, that of the old line being 50 ft. It is said that work on the new tracks, which will practically be a second road generally parallel to the old one, will be begun as soon as the right of way is all acquired. While this work is in progress surveys will be made for the additional tracks from New Haven to Stamford.

It is said also that work will be begun this year on a second track for the Shore Line Division from New Haven to New London.

New York, Pennsylvania & Ohio.—The result of the poll on the resolution offered at the meeting in London last week shows $17,500,000 first-mortgage bonds in favor of the voting trustees, against $3,800,000 for Lord Berry's committee. The vote of the second and third-mortgage bonds was about in the same proportion, showing over four-fifths in favor of the present trustees.

Norfolk & Western.—This company's statement for November and the eleven months ending Nov. 30 is as follows:

	November.	Eleven months.
Earnings	$201,235	$2,204,982
Expenses	132,875	1,199,001
Net earnings	$128,360	$1,005,981

Expenses include estimated proportion of yearly taxes. For the eleven months there was an increase of $143,392, or 6.9 per cent., in earnings; an increase of $146,278, or 13.9 per cent., in expenses, and a decrease of $2,886, or 2.8 per cent., in net earnings.

Ogdensburg & Lake Champlain.—A despatch from Portsmouth, N. H., Dec. 31, says: "In the suits pending in the Circuit Court of the United States in this district, between the Ogdensburg & Lake Champlain Railroad, the Northern Railroad in New Hampshire and the Nashua & Lowell Railroad, Mr. H. B. Wilbur, who, with C. S. Mellen, was by agreement of parties selected to state accounts of tonnage of freight brought by the steamboats of the Northern Transportation Company to the line between Ogdensburg and Boston, via Concord, has filed his report. It shows that the total tonnage brought by the steamers to the line from March 1, 1871, to the close of business for the year 1874, was 557,584,843 lbs. The gross receipts therefor were $1,146,849.42; of this the Boston & Lowell received $10,659.66; the Nashua & Lowell $4,789.12; the Northern Railroad, $83,125.97. The freight carried from these roads was 170,740,154 lbs., for which was received $284,064.09. Of this the Boston & Lowell received $12,143.99; the Nashua & Lowell, $5,455.99, and the Northern Railroad, $12,980.91. These accounts were agreed by the respective counsel to be prepared and filed in Court, and pending the examination of the sources of information from which have been derived these figures, the taking of testimony in the cases has been suspended, as well of course as all legal questions which may arise in the controversy."

Pemigewasset Valley.—Track is now laid from the Boston, Concord & Montreal, at Plymouth, N. H., northward 18 miles. About two miles remain to complete the road to North Woodstock, but this section will take some time, as a long rock-cutting is to be finished.

Philadelphia & Reading.—The Receiver's statement for November and the fiscal year ending Nov. 30, is as follows:

	November. Gross.	November. Net.	Year. Net.
Railroad Co.	$2,256,749	$1,104,564	$9,859,065
Coal & Iron Co.	1,657,792	303,121	1,200,174
Total	$3,914,541	$1,407,685	$11,059,239
Net earnings, 1881:			
Railroad Co.		$1,017,265	$9,141,946
Coal & Iron Co.		228,182	1,190,445
Total		$1,245,447	$10,341,391

The total net increase for the month is $162,238, or 13.1 per cent.; for the year, $717,848, or 6.9 per cent.

A dispatch from Philadelphia, Jan. 3, says: "President Gowen, when asked as to the truth of the rumor that he was negotiating for the sale of $35,000,000 of general mortgage bonds, said that he would say nothing on the subject before the publication of his plans for the relief of the company. It was learned, however, from a leading financier of this city, who took a part of the bonds himself, that the sale had been consummated. The Reading general mortgage provides for four classes of bonds, comprising among others $5,000,000 of 7 per cents which have never been issued. It is these 7s whose sale has just been effected. They were sold for cash at par. The gentleman referred to, who has very intimate relations with Mr. Gowen, when asked how it could benefit the company to float this amount of bonds bearing such a high rate of interest, said that it would enable the company to finish paying off its floating debt, redeem the Receivers' certificates, and discharge the receivership, and that the 7 per cent. bonds could be called in and paid off at the pleasure of the company. It is known to be Mr. Gowen's opinion that any or all of the general mortgage bonds can be called for the sinking fund of that loan, but many good lawyers do not agree with him on that point.

"The same gentleman said that the proposition to retire the junior securities of the company and to issue 5 per cent. consols in their place had been abandoned so far as the convertible debenture 7s amounting to $10,422,900 were concerned, because the holders of the 7s decline to make the exchange. But they have agreed to take 5 per cent. consols for three years interest on their 7s. That is, they will surrender one year's coupons due and two years to become due for the same amount of 5 per cent. consols. This will add $2,188,788 to the bonded debt of the company, and while it relieves the company of the payment of that much in interest during the next two years, it is really compounding interest and laying up burdens that will have to be met some time. In the meantime, the whole amount of convertible 7s outstanding is not reduced at all."

Rochester & Pittsburgh.—The following notice has been issued to holders of income bonds:

"The board of directors have decided that a sufficient number in amount of the income bondholders of the company have assented to the proposition to accept consolidated first mortgage bonds in exchange for their income bonds to justify them in authorizing the exchange on the proposed terms, viz:

"The income bonds will be accepted at 50 per cent. of their face value in payment for the consolidated first-mortgage bonds at par. The holders of the income bonds who assent in writing to the exchange before Feb. 1, 1883, will receive the consolidated bonds at par flat—that is, with interest from Dec. 1, 1882. The holders of the income bonds who delay their assent until after Feb. 1, 1883, will be obliged to pay the accrued interest on the consolidated bonds from Dec. 1, 1882, in order to avail themselves of the privilege of making the exchange.

"The consolidated first-mortgage bonds will be ready to deliver in exchange for the income bonds Feb. 1 next, and it will facilitate matters if the holders of the income bonds will send in their assent as promptly as possible."

St. Louis, Fort Scott & Wichita.—This road is now completed to Eldorado, Kan., 34 miles westward from the late terminus at Eureka, and 134 miles from Fort Scott. The first train reached Eldorado on Dec. 31, and regular trains will soon be put on.

St. Louis, Iron Mountain & Southern.—The Doniphan Branch is now all graded from the main line at Neeleyville, Mo., to Doniphan, 19 miles, and track is laid to the Little Black River, 7 miles. The bridge over the river is nearly completed.

The White River Branch is now graded from Kerrigan, Ark., to Batesville on White River, 26 miles, and nearly all the bridges are finished. Track is laid for 12 miles from Kerrigan.

Surveys are being made for another branch from Hope, Ark., to Magnolia in Columbia County, a distance of 36 miles.

Securities on the New York Stock Exchange.—The following securities have been put on the lists at the New York Stock Exchange:

Chicago, Milwaukee & St. Paul, $540,000 additional Chicago & Pacific Western Division 5 per cent. bonds.

Gulf, Colorado & Santa Fe, $420,000 additional first-mortgage bonds, issued on new road.

Northern Pacific, $3,240,000 additional first-mortgage and land grant bonds of 1921.

Sparta & Cincinnati.—This company has been organized to build a railroad from Sparta, Tenn., the terminus of a branch of the Nashville, Chattanooga & St. Louis, eastward about 50 miles to a connection with the Cincinnati Southern near Rockwood.

Texas & St. Louis.—Track is now all laid from Bird's Point, Mo., to the White River in Arkansas, 216 miles, and the bridge over the river is completed. There now remains only the gap of 45 miles between the White and Arkansas rivers on which track is still to be laid.

Virginia Midland.—Of the recent election of directors, the Baltimore *Sun* says: "The formation of this board has been the result of an understanding between the interests represented, which are working harmoniously to produce the best results of the property. * * * It was stated in the Alexandria *Gazette* to-day that it was understood that, in consequence of the failure of the Richmond & West Point Terminal Co. to pay a remainder of $600,000 still due the Baltimore parties who sold the road, the latter propose to resume the proprietorship of the stock sold to that company. It is understood that at the time of the sale Mr. John W. Garrett, who had a large private holding in the road, the Baltimore & Ohio, and other Baltimore parties, held on to the stock, by agreement, until the whole purchase money should be paid. About $4,000,000 has been paid, but the payment of the remaining $600,000 has been extended several times."

Wabash, St. Louis & Pacific.—The following statement is published for the eleven months ending Nov. 30:

	1882.	1881.	Increase.	P. c.
Earnings	$15,406,405	$13,173,132	$2,233,273	17.0
Expenses	10,621,214	9,702,115	919 009	9.5
Net earnings	$4,785,191	$3,471,017	$1,314,174	37.6
Per cent. of expenses.	68.94	73 65	.....	....

No statement is made of the amount of fixed charges, which must be considerably greater this year than in 1881.

Western Union Telegraph.—Judge Arnoux, in Superior Court, Chambers, granted an injunction to restrain the Western Union Telegraph Co. from paying a dividend on $15,526,590 of the capital stock issued to its stockholders in the early part of 1881 under the agreement between it and the American Union and Atlantic & Pacific telegraph companies. The *Times* report of the case has the following: "The injunction was obtained by William S. Williams, a stockholder of the Western Union. The motion for it was heard by Judge Arnoux on Tuesday last. On the same day checks of the Western Union, issued to its stockholders on Saturday last in payment of their dividends, were cashed. The dividend of 1½ per cent. upon its capital stock was declared on Dec. 13, payable on Jan. 15, 1883. On Dec. 14 Mr. Williams began his suit by which he sought to prevent the payment of dividends upon the Western Union's new stock, representing $38,000,000, and to compel the holders of the stock to repay dividends they had received. Four days later notice of the motion for a temporary injunction was given, and immediately afterward the preparation of the checks for its stockholders' dividends was begun by the Western Union, the purpose of the issuance of the checks evidently being to evade the immediate effect of an injunction.

"In beginning his opinion in the case, Judge Arnoux recites the above facts, and then says: 'The Court is not advised and cannot judicially take knowledge that this proceeding is in any wise different from the ordinary course pursued by this company in anticipating its dividends when it has the money in its treasury to make such payments. And the Court would be loth to believe that a board of direction embracing gentlemen of high character would set an example of evasion of the mandates of the courts. If it should, however, hereafter be proved that this action has been unusual, and has been induced by fear of the decision of the Court on this motion, these gentlemen may find that they have assumed a responsibility greater than they now contemplate. The Court in deciding this motion will proceed upon the assumption that the board of directors of the Western Union Telegraph Company have acted in a lawful and law-abiding spirit, and will determine this question submitted to it upon the facts and the law applicable thereto.' After referring to the terms of the agreement between the Western Union, American Union and Atlantic & Pacific telegraph companies, and to the distribution of $15,526,590 of new Western Union stock to its stockholders in accordance with that agreement, Judge Arnoux says: 'This stock has been held by this Court to have been illegally issued, leaving the question of its legal creation to be hereafter decided, for, whether this is legal stock illegally issued, or void stock, has not been decided. While this decision stands it must be assumed to be the law. There is no presumption that it will be reversed, and upon this basis this decision must proceed. * * * The motion for an injunction against the payment of any dividend upon the $15,526,590 of the capital stock, being so much of the shares thereof as was distributed in the stock dividend in question, is granted, and in other respects the motion is denied.'

"Judge Arnoux also granted a motion to renew the injunction order in the suit of Rufus Hatch against the Western Union and others, so far as its provisions are applicable to the present state of the suit, which is similar to the original Williams action. The injunction order restrained the issuance by the Western Union of stock to represent its increased capital, and also the payment of dividends upon such stock. As renewed, it simply restrains the payment of dividends upon the $15,526,590 of stock illegally issued. Judge Arnoux's reason for putting it into force again is that the reversal by the Superior Court, General Term, of Judge Truax's decision, dismissing the Williams and Hatch suits, puts those suits into the condition in which they were before their trial at Special Term. The only effect produced by the trial and the decision following it was to give the defendants an opportunity to do acts which the injunction had forbidden them to do. Those acts having been done, the injunction order could not be reviewed in its entirety, but only with respect of its provision that remained executory in accordance with the decision of the General Term—the provision restraining the payment of dividends upon the stock issued as a stock dividend in 1881."

The above injunction order was modified. The order of Judge Arnoux on Wednesday granted the application of the plaintiff only as to some $15,000,000 of the stock, the dividends on which would amount to about $200,000, and the *World* reports that counsel for the company proposed that the company should give a bond for the amount to cover any unwitting disobedience to the order of the Court, its stock being so intermingled by transfers and retransfers that it is almost impossible to separate or distinguish between the $15,000,000 enjoined and the remainder. Judge Arnoux took this proposition under advisement, and when the counsel came before him he said: "I have taken this matter into very earnest consideration and I have determined on this: That I will so far modify the order as to allow payments to be made so far as there is any possibility of distinguishing between the different portions of the stock, and, in addition, allow the defendant to give a bond for the early repayment of moneys to the treasury of the company in case the judgment of the General Term should be affirmed. And I want to give the counsel the reason for this determination. I do not propose it to be paid in the shape of an indemnity to the plaintiff, for I think he has an absolute right to demand that the funds of the company shall not be diverted, and if, therefore, the Court of Appeals should say that the decision of the General Term should stand, any money paid out improperly should be returned to the treasury of the corporation: and if it is so returned, then the plaintiff is not in any way injured.'"

West Jersey.—This company's gross earning for November were $68,858; expenses, $54,234; net earning, $14,622. This includes receipts of $4,481, and expenses, $6,564 for the West Jersey & Atlantic Railroad. The net surplus of the West Jersey Railroad and branches over all obligations for the eleven months of 1882 was $191,584, being an increase, as compared with the corresponding period of last year, of $29,886, or 18.4 per cent.